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Operating Instructions

ISOBUS job computer for field sprayers

Version: V1.20130125

30303103-02-EN

Read and follow these operating instructions.

Keep these operating instructions in a safe place for later reference.

Imprint

Document

Operating Instructions
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1 For your safety

1.1 Basic safety instructions

Please read the following safety instructions carefully before operating the product for the first time.

- Before leaving the vehicle cab, ensure that all automatic mechanisms have been deactivated or manual mode is activated.
- In particular, deactivate the following systems if they are installed:
  - TRAIL-Control
  - DISTANCE-Control
- Keep children away from the trailer device and from the job computer.
- Do not make any unauthorized modifications to the product. Unauthorized modifications or use may impair safety and reduce the service life or operability of the unit. Modifications are considered unauthorized if they are not described in the product documentation.
- Never remove any safety mechanisms or stickers from the product.
- Carefully read and follow all safety instructions in this operating guide and in the field sprayer operating instructions.
- Observe all applicable regulations on accident prevention.
- Follow all recognised safety, industrial and medical rules as well as all road traffic laws.
- Before charging the tractor battery, always disconnect the tractor from the job computer.
- Use only clear water when you are testing the field sprayer. Do not use a poisonous spray during the tests or when calibrating the systems.

1.2 Layout and meaning of warnings

All safety instructions found in these Operating Instructions follow the pattern set out below:

⚠ WARNING

This signal word identifies medium-risk hazards which could potentially cause death or serious bodily injury if they are not avoided.

⚠ CAUTION

This signal word identifies low-risk hazards which could potentially cause minor or moderate bodily injury or damage to property if they are not avoided.

NOTICE

This signal word identifies actions which could lead to operational malfunctions if performed incorrectly.
These actions require you to work in a precise and careful way in order to produce optimum results.

Some actions need to be performed in several steps. If there is a risk involved in carrying out any of these steps, a safety warning will appear in the instructions themselves.

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Safety instructions always directly precede the step involving risk and can be identified by their bold font type and a signal word.

Example

1. **NOTICE! This is a notice. It warns that there is a risk involved in the next step.**
2. Step involving risk.

1.3 Layout and meaning of alert messages

An alarm message may appear while the device is in use.

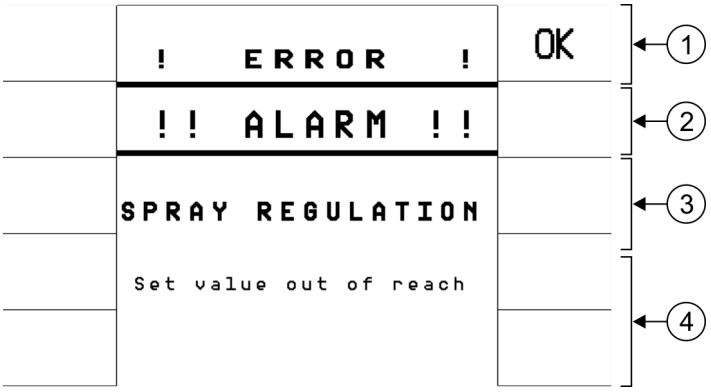
Purpose

The purpose of the alarm messages is as follows:

- **Warning** - These messages warn the operator if the current status of the field sprayer could lead to a dangerous situation.
- **Information** - These messages inform the operator that the current status of the field sprayer or configuration is not correct and could lead to faults in operation.

Illustration

The screen shot below shows how the alarm messages are structured:



Layout of alarm messages

(1)	Type of alarm	(3)	Name of the component that caused the alarm.
(2)	"ALARMS" message	(4)	Problem description and solution What the exact cause of an alarm message is or how you rectify a fault can be read in the section "Alarm messages [➝ 83]"

1.4 User requirements

- Learn to operate the product in accordance with the instructions. Nobody must operate the product before reading these Operating Instructions.
- Please read and carefully observe all safety instructions and warnings contained in these Operating Instructions and in the manuals of any connected machines and farm equipment.
- If there is anything within these Operating Instructions that you do not understand, please do not hesitate to contact us or your dealer. Müller-Elektronik's Customer Services department will be happy to assist you.

1.5 Intended use

The job computer is used to control field sprayers in agriculture. The manufacturer shall not be held responsible for any installation or use that goes beyond this.

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Intended use also includes the adherence to the conditions for operation and repairs prescribed by the manufacturer.

The manufacturer cannot be held liable for any personal injury or property damage resulting from such non-observance. All risk involved during improper use lies with the user.

All applicable accident prevention regulations and all other generally recognized safety, industrial, and medical rules as well as all road traffic laws must be observed. Any unauthorized modifications made to the unit will void the manufacturer's warranty.

1.6 EC declaration of conformity

This product has been manufactured in conformity with the following national and harmonised standards as specified in the current EMC Directive 2004/108/EC:

- EN ISO 14982

1.7 Disposal

When it has reached the end of its service life, please dispose of this product as electronic scrap in accordance with all applicable waste management laws.

1.8 Safety sign for the field sprayer

If the field sprayer is fitted with drawbar steering or with axle steering, everyone approaching the field sprayer must be warned of possible dangers. For that reason you receive a safety sign.

1. Stick the safety sign in the appropriate place.

The following rules apply to attaching safety signs:

- Safety signs must be attached at a visible location so that they can be seen by everyone approaching the danger zone.
- If the danger area can be approached from several sides of the machine, attach the warning signs on all machine sides.
- Regularly check the safety signs for completeness and legibility.
- Replace damaged or unreadable signs with new ones.

Safety sign	Where to attach	Meaning
	Close to the bend area, between tractor and trailer device	Do not stay in the bend area during operation.

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1.9 Safety sticker on the product

Sticker on the job computer

	Do not clean with a high-pressure cleaner.

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2 About this operating manual

2.1 Target group of these Operating Instructions

These Operating Instructions are intended for operators of field sprayers equipped with a job computer from Müller-Elektronik.

2.2 Applicability

These Operating Instructions apply to these products:

- ISOBUS job computer for sprayers from Müller-Elektronik. From software version: 6.4i

2.3 Illustrations in these operating instructions

The role of the diagrams on the software interface is to serve as a reference. They help you in finding your way around the software screens.

The information shown on the screen is dependent on various factors:

- the type of field sprayer,
- the configuration of the field sprayer,
- the condition of the field sprayer,

For this reason the diagrams in these operating instructions may show different information from the terminal.

The instructions were written for the operation of the job computer on terminals from Müller-Elektronik. If the job computer is operated with other ISOBUS terminals, the screen layout and the information represented may differ from the diagrams in this operating manual.

2.4 Layout of instructions

The instructions explain step by step how to perform certain operations with the product.

Throughout these Operating Instructions we use the following symbols to identify instructions:

Type of symbol	Meaning
1. **2.**	Actions that must be performed in succession.
⇨	Result of the action. This will happen when you perform an action.
⇨	Result of an instruction. This will happen when you have completed all the steps.
☑	Requirements. Any requirements specified must be put in place before an action can be performed.

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2.5 Layout of references

If any references are given in these Operating Instructions, they will appear as follows:

Example of a reference: [➞ 11]

References can be identified by square brackets and an arrow. The number following the arrow shows you the page where the chapter starts and where you can find further information.

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3 Product description

3.1 The ISOBUS job computer on the field sprayer

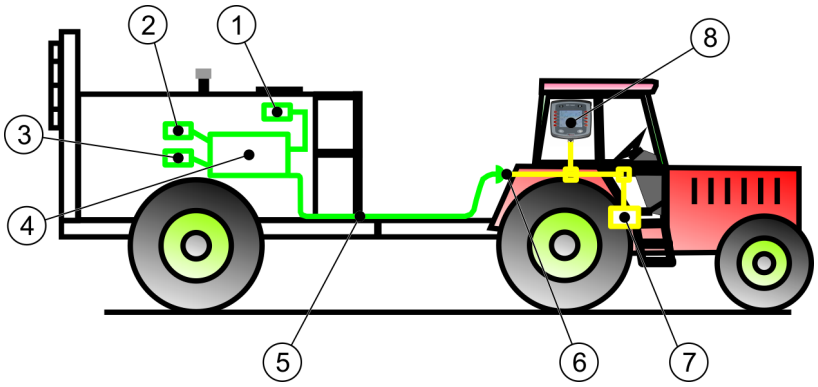
The ISOBUS job computer for field sprayers equips your sprayer with technology that we have developed to meet the latest requirements of ISO standard 11783. Our long experience, gained during more than 20 years of developing CAN bus components, has played a vital role in the design of this technology. You can connect your ISOBUS-compatible field sprayer to any tractor fitted with an ISOBUS terminal.

The number of agricultural machines, implements and tractors equipped with ISOBUS-compatible job computers and terminals will rise rapidly in the future. Therefore, installing ISOBUS equipment on your field sprayer already puts you one step ahead.

ISO standard 11783

ISO standard 11783 defines the transmission medium, connection and data exchange system for ISOBUS. ISOBUS works on the basis of a CAN bus, which is also used in the automobile and commercial vehicle sector. The ISOBUS controls data exchange between the operating terminal, the job computers on the tractor and the mounted or trailed machines. Compatibility of ISOBUS devices, in accordance with ISO standard 11783, is tested by independent test institutes. The device does not receive the ISOBUS certificate until it has passed this test.

The diagram below shows the components that make up the system. They are usually installed by the field sprayer manufacturer.



ISOBUS system on the tractor

1	Distributor A	5	Connector cable
2	Distributor B	6	ISOBUS socket for ISOBUS basic equipment
3	Distributor C	7	ISOBUS basic equipment
4	ISOBUS job computer	8	ISOBUS terminal

Distributors

Cables from sensors and actuators come together in the distributors.

There may be several distributors, each responsible for a specific function. For example:

- Distributor A
  Sensors and components which are responsible for controlling the application rate.
- Distributor B
  All hydraulic functions. For example, hydraulic cylinders for raising and lowering the boom.
- Distributor C
  Sections and corner nozzles

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Job computer

The ISOBUS job computer for field sprayers is the brain and nerve centre of the field sprayer. It measures all the signals, controls the actuators, displays information on the ISOBUS terminal and receives commands from the operator via the terminal.

All machine-specific data are stored in the job computer and are therefore retained when the terminal is replaced.

The individual sensors and actuators are connected to the job computer by cable harnesses and/or distributor boxes which are connected to the three plug connectors on the job computer.

Connector cable

The connector cable connects the job computer to the ISOBUS socket for the ISOBUS basic equipment.

ISOBUS basic equipment

This acts as an interface between tractors and attached implements.

Terminal

The terminal acts as an interface between the job computer and the driver. The driver can operate the job computer via the terminal.

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4 Connecting the ISOBUS job computer to the ISOBUS basic equipment

Procedure

This is how you connect the job computer to the ISOBUS basic equipment:

☑ Tractor is ISOBUS-capable.

☑ Job computer is fitted to the field sprayer.

☑ Field sprayer has been attached to or is trailed by the tractor.

1. Pull cable from the field sprayer to the ISOBUS basic equipment socket.
2. Unfasten dust protection caps.
3. Insert ISOBUS plug into the tractor's ISOBUS socket and screw in.
4. Connect dust protection caps with one another to protect the sockets from dust.
   ⇨ You have connected the job computer to the basic equipment.
5. Check whether the job computer is correctly connected by starting it up.

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5 Basic control principles

5.1 Switching job computer on and off

Procedure

You can switch on the job computer as follows:

1. Provide job computer with power. The possibilities for this are as follows:
   a) For ISOBUS tractors: Switch on the tractor with the ignition key.
   b) For non-ISOBUS tractors: Switch on the terminal.
2. The LED on the multi-function joystick begins to light up.

⇨ You have switched on the job computer.

Procedure

You can switch off the job computer as follows:

1. Cut power to the job computer. The possibilities for this are as follows:
   a) For ISOBUS tractors: Switch off the tractor with the ignition key.
   b) For non-ISOBUS tractors: Switch off the terminal.
   c) For all tractors: Pull cable between the tractor and the field sprayer from the jack.
2. Wait until the LED on the multi-function joystick goes out.

⇨ You have switched off the job computer.

5.2 Initial start-up

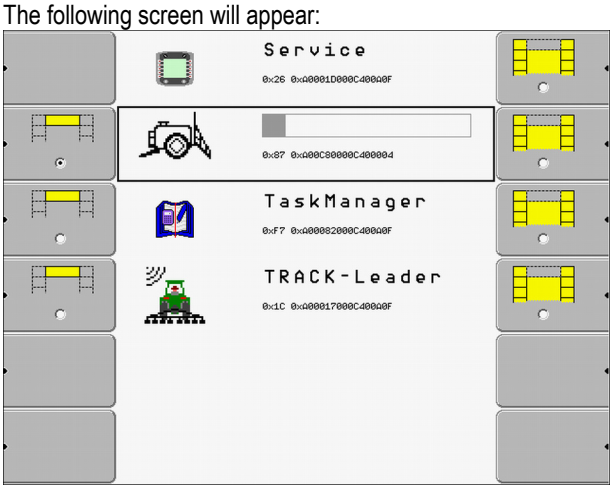
Once the job computer is fitted, installed and connected to the terminal, you can start it up for the first time.

Procedure

☑ The job computer is connected to the ISOBUS basic equipment.

☑ An ISOBUS terminal is connected to the ISOBUS basic equipment.

1. Switch on the job computer. [➞ 15]
2. Switch on the terminal.
3. - Open the "Selection Menu" application.
   ⇨ The following screen will appear:



   ⇨ The job computer will be loaded by the terminal. You will see the progress display next to the Job Computer Sprayer application icon.
4. Wait until no more progress bars appear.

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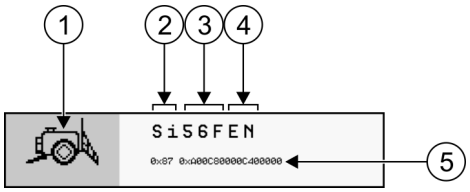
5. - Click on the line with the icon for the application.
   ⇨ The job computer work screen will appear. [→ 16]
6. If you are using two terminals, you should also read: Displaying the job computer on a second terminal [→ 66]

5.3 Job computer in the terminal selection menu

The Job Computer Sprayer application registers with any terminal using its ISO identifier.

In Müller-Elektronik terminals the job computer registers in the application "Selection Menu".



Job computer during registration in the selection menu

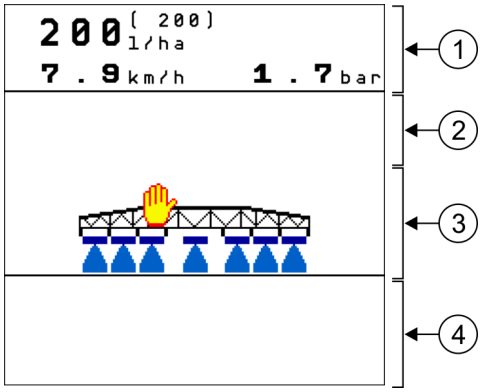
1	**Job Computer Sprayer application icon**	4	**Language**
2	**Type of job computer** "s" stands for sprayer	5	**Hardware serial number** Using this number the job computer can identify itself in other applications. For example in the Farm Management Information System. More on this: [→ 47]
3	**Version of the object pool** The object pool is the part of the software that contains images and text. You can learn how to check the full software version in the section: Checking the software version [→ 80]		

5.4 Screen structure

5.4.1 Work screen with a field sprayer

The work screen is always displayed during work and contains the most important information. The work screen informs you about the status of the field sprayer during work.

The work screen is divided into four areas.



Areas on the work screen

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(1)	"**Spray data**" area	(3)	"**Boom terminal**" area
(2)	Selectable area 1	(4)	Selectable area 2

You can read about the information that appears in these areas in the following sections.

5.4.2 Selectable area 1

This area has two pages:

- Page with information about the activated functions
- Page with counters

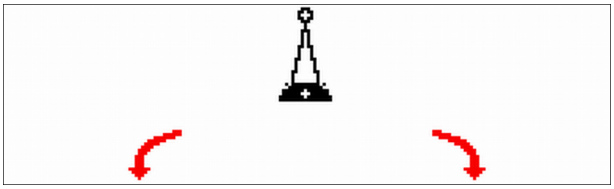
Controls

- Switch between page 1 and page 2

Information on page 1

This page always tells you about the current status of the field sprayer.

The following diagram shows the information that can appear in this area:



Selectable area 1: Page 1

Icons

The following symbols may appear depending on the configuration:

Icon	Meaning
or	TRAIL-Control activated as drawbar steering. See section: TRAIL-Control – Using drawbar and axle steering [➞ 69]
	Drawbar for TRAIL-Control is locked. See section: Locking TRAIL-Control [➞ 72]
	Boom is folded in and in the transport position. TRAIL-Control can only be used in manual mode.
	Raising boom.
	Lowering boom.
	Sloping boom. The side on which the icon appears is being raised.
and	Boom is being tilted up. See section: Tilting booms up and down [➞ 29]

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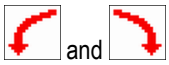
Icon	Meaning
 and	Boom is being tilted down.

Information on page 2

The following diagram shows the information that can appear in this area:

Selectable area 1: Page 2

1	**Current tank content** Depending on the field sprayer equipment, this will show either the calculated or measured tank content.	4	**Flow rate per minute** Flow rate through the main flow meter.
2	**Workable area** With the current tank content and the current application rate, the area shown here can still be processed.	5	**Area output / hour**
3	**Workable distance** Under the current conditions, this distance can still be processed.		

See also

- TRAIL-Control – Using drawbar and axle steering [→ 69]
- Locking TRAIL-Control [→ 72]

5.4.3 Boom terminal area

In the boom terminal you find the following information:

- Number of sections
- Which sections have been preselected or switched off
- Which sections are applying

Possible states

There are four status settings for the sections.

The status of a section is displayed in the boom display area of the work screen.

The section status settings are as follows:

Display	Section status
	Section is switched off.
	Section is preselected. Section is ready for application.

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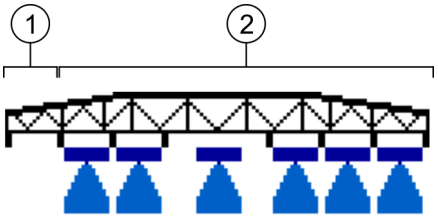
Display	Section status
	Section is preselected and the main section switch is switched on. Section is carrying out spray application.
	Section was switched off manually while the SECTION-Control application was operating in automatic mode. This section is not switched on or off while SECTION-Control is operating in automatic mode.

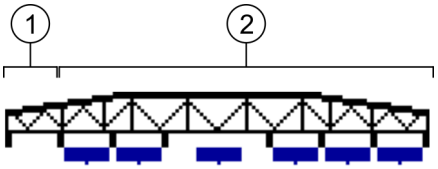
Illustration

The diagrams below show how the sections may appear in the boom display area:



Boom terminal area – example 1

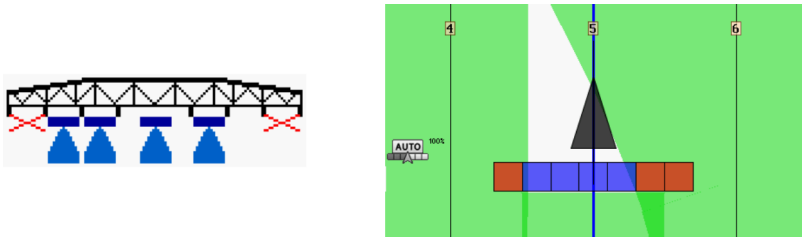
1	**Section 1** is switched off.	2	**Sections 2 to 7** are preselected and applying.



Boom terminal area – example 2

1	**Section 1** is switched off.	2	**Sections 2 to 7** are preselected but are not applying.

Additional status settings are available if you are using the SECTION-Control application. The next diagram shows how the section status is represented if a wedge-shaped area is being treated and the user has previously deactivated the outer sections using the multi-function joystick.



Section status. Left: on the job computer; Right: with SECTION-Control

Sections 1 and 7 have been deactivated manually using the multi-function joystick.
Sections 2 to 5 are carrying out spray application.
Section 6 has been deactivated by SECTION-Control.

5.4.4 Selectable area 2

This area shows which additional functions have been activated.

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If you activate an additional function, an icon appears in the "Additional functions" area.

This area has two pages:

- Page with information about the additional functions activated.
- Page with information about the sensor status.

Controls

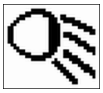
- Switch between page 1 and page 2

Information on page 1

On the first page appear icons that provide information to you about the additional functions that are activated.

Icons

The following symbols may appear depending on the configuration:

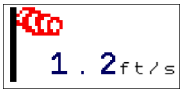
Icon	Meaning
	Lights are switched on.
	Rotating beacon is switched on.

Information on page 2

On the second page appear icons that provide information to you about the state of several sensors.

Icons

The following symbols may appear depending on the configuration:

Icon	Meaning
	Current wind strength
	Current pump speed
	Current fan speed

5.4.5 Layout of additional screens

Many functions of the job computer are dependent on the model of the field sprayer and its equipment. These functions are operated via the function keys whose function icons are in the so-called "Additional Screens".

Depending on how many additional functions your field sprayer has, the function icons may appear on different additional screens. You will only see in the operating instructions whether you need to switch to additional screens.

Path

You can access additional screens as follows:

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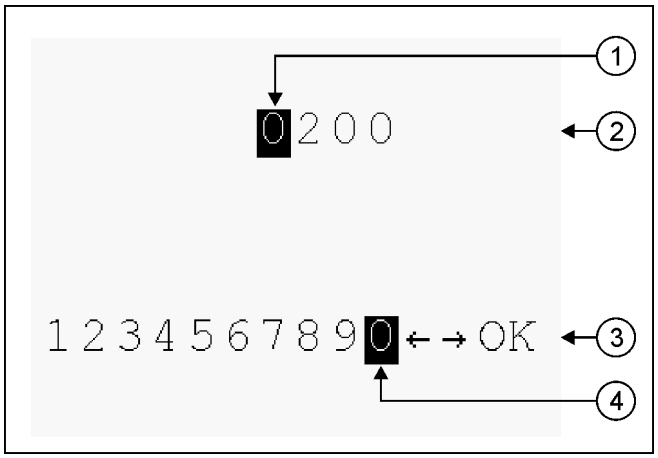
1. - Press in the work screen.
   ⇨ Additional screens appear

5.5 Inputting data

In this section you learn how to enter data when the data input screen appears.



Data input screen

1	**Cursor 1** On the input field mark the position where a new number should be entered.	3	**Numbers for selection**
2	**Input field** Contains number fields for entering a value.	4	**Cursor 2** Selects a number to be entered in the input field.

Procedure

Enter a number as follows:

☑ You have called up the data input screen.

☑ Cursor 1 marks the position in the input field where a new number will be entered.

1. Mark the desired number with cursor 2.
2. Click on the marked number.
   ⇨ The number clicked appears in the input field.
   ⇨ Cursor 1 moves one field to the right
3. Set additional numbers.
4. Highlight and click on "OK" to terminate the input and apply it.

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6 Operating job computer sprayer on the field

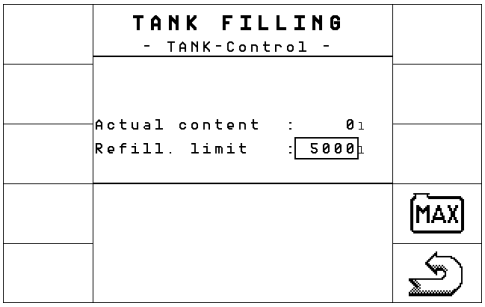
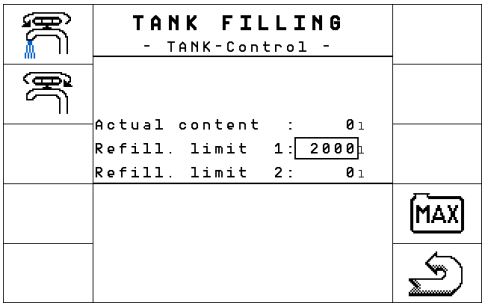
6.1 Tank filling

After each fill-up of the spray liquid tank, you can tell the job computer how much water you added.

Methods

1. Open the "Tank filling" screen:

2. Compare the "Tank filling" screen with the screens in the table below and read the relevant section:

If you see this screen ...	... Read this chapter:
	Filling up the tank manually without additional systems [➞ 22]
	Filling up the tank with TANK-Control [➞ 23]
	Filling up the tank with TANK-Control and fill stop [➞ 23]

6.1.1 Filling up the tank manually without additional systems

If you fill up the spray liquid container manually without any additional systems, you need to enter the new tank content manually on the terminal.

Controls

Function icon	Function
	Tank was fully filled up.

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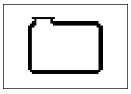
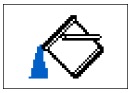
Function icon	Function
	Set tank content to 0 liter.

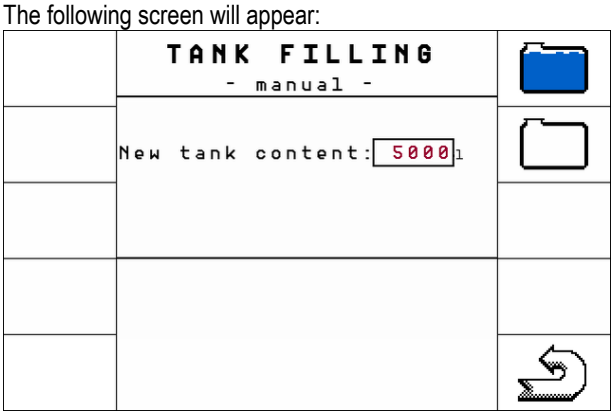
Procedure

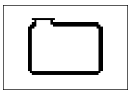
Enter the new tank content in this way if you have fully filled up the liquid container:

1. Switch to screen "Tank filling – manual":

   ⇨ The following screen will appear:

2.  - Set tank content back to 0 liter.
3. - Enter full tank.

   or

4. In the field "New tank content", enter the tank content after the fill-up.

⇨ The new tank content appears in the work screen, in the tank data area.

6.1.2 Filling up the tank with TANK-Control

TANK-Control is a measurement system that constantly measures and displays the tank content.

Procedure

1. Switch to screen "Tank filling – TANK-Control":

2. Start filling.
   ⇨ While the fill-up is taking place, the filled quantity appears in the screen "Tank filling – TANK-Control" in the line "Active tank content".
3. When the tank is full, switch off pump.

6.1.3 Filling up the tank with TANK-Control and fill stop

If a TANK-Control with fill stop has been installed and configured on the field sprayer, you can use it. It will stop tank filling automatically when a specified fill level is reached.

You can define up to two refill limits for tank filling. The system stops filling the tank when the tank content reaches these refill limits.

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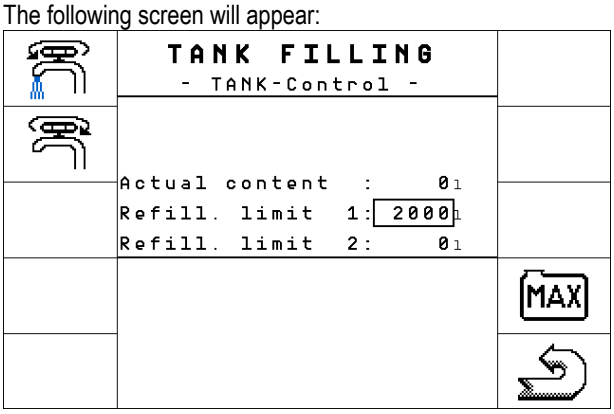
Tank filling with one refill limit

Use this method if you want to fill the tank with just one product.

☑ Tank is empty!

☑ TANK-Control with fill stop is installed on the field sprayer.

1. Switch to the "Tank filling - TANK-Control" screen:

⇨ The following screen will appear:


2. Set the "Refill limit 1" parameter. Specify the number of liters to be added to the tank before filling stops.
3. - Open the ball valve.
⇨ The following icon will appear on the screen:
⇨ Tank filling starts.
⇨ When the fill level defined as "Refill limit 1" is reached, the ball valve closes and tank filling ends.

Tank filling with two refill limits

With this filling method you can define two refill limits. This means that you can add two different products to the tank and define a refill limit for each one.

Controls

Use the following function keys to operate the function:

Function icon	Function	Effects
	Open ball valve for tank filling	- Ball valve opens. - The following icon will appear on the screen: - Product is added to the tank. - Current tank content changes slowly.
	Close ball valve for tank filling	- Ball valve closes.

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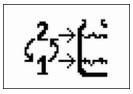
Function icon	Function	Effects
	Change active refill limit	Only the refill limit selected is taken into account while filling the tank. The tank is filled until the fill level is reached.

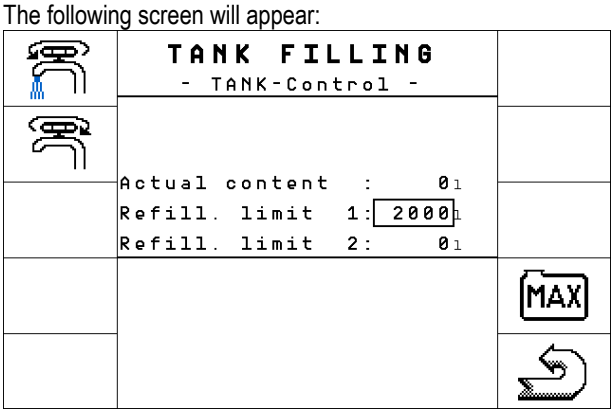
Procedure

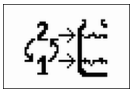
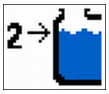
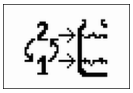
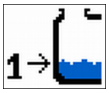
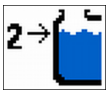
To fill the tank with two refill limits:

☑ Tank is empty!

☑ TANK-Control with fill stop is installed on the field sprayer.

1. Switch to the "Tank filling - TANK-Control" screen:

   ⇨ The following screen will appear:
   

2. Set the "Refill limit 1" parameter. Specify the number of liters of the first product to be added to the tank before filling stops.
3. Set the "Refill limit 2" parameter. Specify the number of liters of the second product to be added to the tank before filling stops.
   ⇨ A new function icon appears on the screen: 
   ⇨ The icon  shows the refill limit at which the next refill will stop.
4.  - Select refill limit 1.
   ⇨ The icon on the screen changes: 
5. - Open the ball valve.
   ⇨ Tank filling starts.
   ⇨ When the fill level defined as "Refill limit 1" is reached, the ball valve closes and tank filling ends.
   ⇨ The icon on the screen changes: 
6. Prepare the field sprayer for addition of the second product.

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7. - Open the ball valve.
   ⇨ Tank filling starts.
   ⇨ When the fill level defined as "Refill limit 2" is reached, the ball valve closes and tank filling ends.

6.2 Controlling boom

In this section you learn how to control the boom using the terminal.

CAUTION

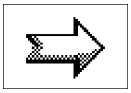
Injury to persons through improper operation
Every field sprayer is designed differently and must be operated differently. In this section only the icons that appear on the screen of the terminal can be explained.

- Read the field sprayer operating guide.
- Learn in what sequence your field sprayer needs to be operated safely.

6.2.1 Raising and lowering boom

Path

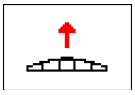
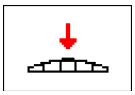
You will reach the screen with this function as follows:

or 

Controls

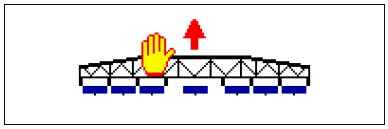
To operate this function the user needs the multi-function joystick first of all.

Use the following function keys to operate the function:

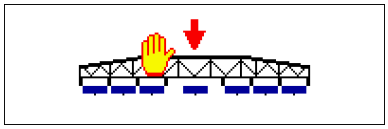
Function icon	Function
	Lift boom
	Lower boom
	Activate and deactivate DISTANCE-Control

Illustration

On the following diagram you see how this function is shown on the work screen:



Lifting boom on the work screen



Lowering boom on the work screen

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The arrows only appear on page 1 of the boom display area.

6.2.2 Locking boom

This function makes it possible to lock the boom so it remains stable when the weight is unbalanced.

Path

You will reach the screen with this function as follows:

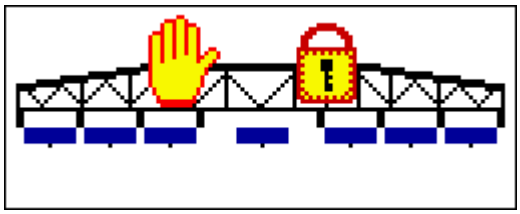
Controls

Use the following function keys to operate the function:

Function icon	Meaning
	Lock boom
	Unlock boom

Illustration

If you lock the boom and a locking sensor is fitted to the field sprayer, in the work screen and in the "Boom folding" screen the following icon will appear



Work screen: Boom locked

If no locking sensor is fitted to the field sprayer, the icon does not appear.

6.2.3 Folding boom in and out

This function folds the field sprayer boom in and out.

Operation depends on the following factors:

- Number of boom parts that can be folded in and out.
- Type of locking for the folding in and out of the boom.
- Type of field sprayer.

Path

You will reach the screen with this function as follows:

Structure of a boom

The following diagram shows the structure of booms and what the individual boom parts are called. The diagram shows a field sprayer with a seven-part boom, but it also applies to smaller booms.

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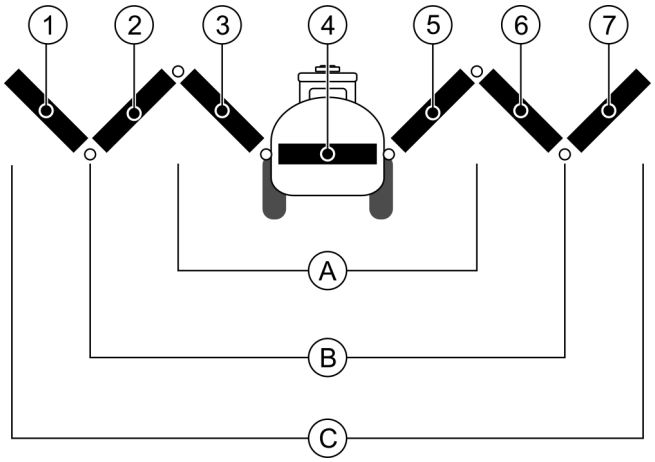


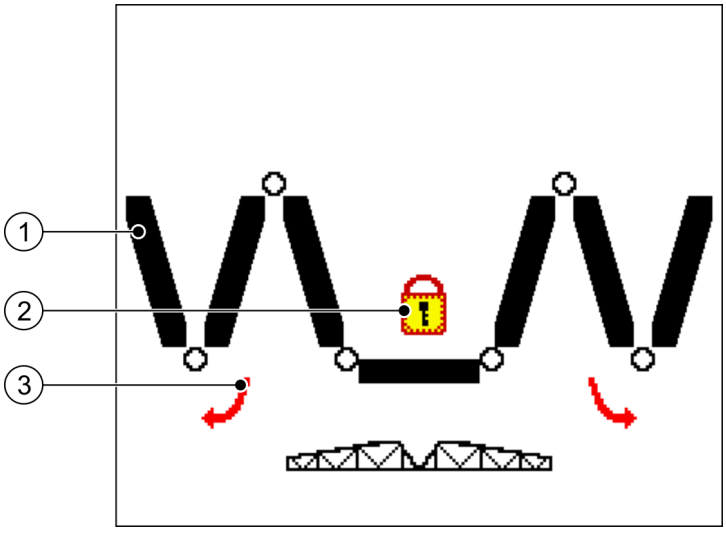
Parts of the boom in a field sprayer

A	Three part boom	3	Boom part: Inner left
B	Five part boom	4	Boom part: Unmoving part
C	Seven part boom	5	Boom part: Inner right
1	Boom part: Outer left	6	Boom part: Middle right
2	Boom part: Middle left	7	Boom part: Outer right

Illustration

Screen

On the following diagram you see how a seven-part boom is shown on the screen.



Representation of the boom on the "Boom folding" screen

1	Parts of the boom
2	Icon: Boom locking is active.
3	Icon: Middle boom section will be folded out Other arrows like this one also appear on the corresponding parts of other boom sections.

Illustration

Function icons

On the following diagram you see how a seven-part boom is shown on the function icons.

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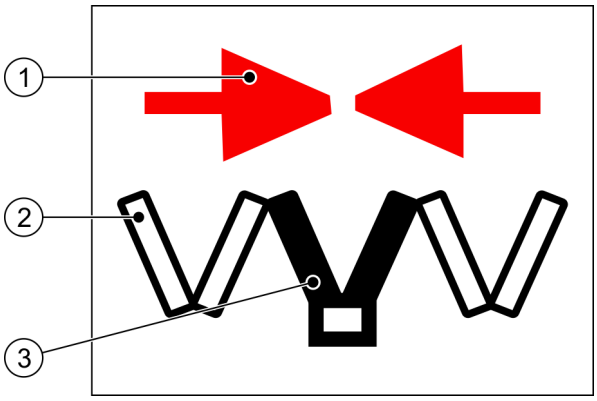
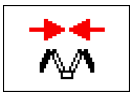


Representation of the function icons

1	Directional arrows Arrow pointing inwards means: Fold in Arrow pointing outwards means: Fold out
2	Sections of the boom marked in white are not folded in or out with this function icon.
3	Sections of the boom marked in black are folded in or out with this function icon.

Controls

Use the following function keys to operate the function:

Function	Three part boom	Five part boom	Seven part boom
Fold in inner boom symmetrically			
Fold out inner boom symmetrically			
Fold in boom in the middle symmetrically			
Fold out boom in the middle symmetrically			
Fold out outer left boom			
Fold out outer right boom			

6.2.4 Tilting booms up and down

When booms are being tilted down and up, the left and right sides of the boom change their angle independently of one another.

- When tilting up, the selected side of the boom is arched upwards.
- When tilting down, the selected side of the boom is arched downwards.

Path

You will reach the screen with this function as follows:

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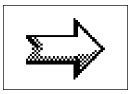
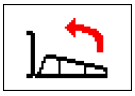
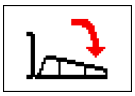
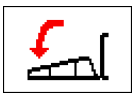
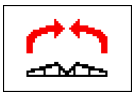


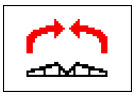
Controls

Use the following function keys to operate the function:

Function icon	Function
	Tilt up right boom.
	Tilt up left boom.
	Tilt down right boom.
	Tilt down left boom.
	Tilt down boom symmetrically.
	Tilt up boom symmetrically.

Procedure

1. Press function button with the desired function.

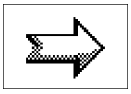
   For example: 

   ⇨ The boom will be tilted up or down.
2. Keep function button pressed until the boom reaches the angle desired.
3. Release function key.

6.2.5 Sloping boom

Path

You will reach the screen with this function as follows:

or 

Controls

To operate this function the user needs the multi-function joystick first of all.

Use the following function keys to operate the function:

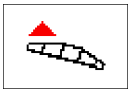
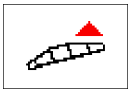
Function icon	Function
	Raise boom on the left, lower boom on the right.
	Raise boom on the right, lower boom on the left.

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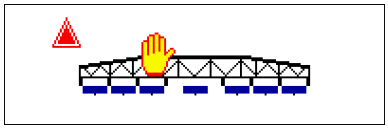
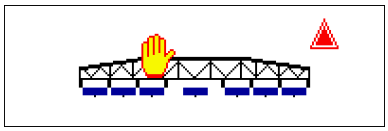
Illustration

On the following diagram you see how this function is shown on the work screen:



Slope boom: raise left, lower right



Slope boom: lower left, raise right

The arrows only appear on page 1 of the boom display area.

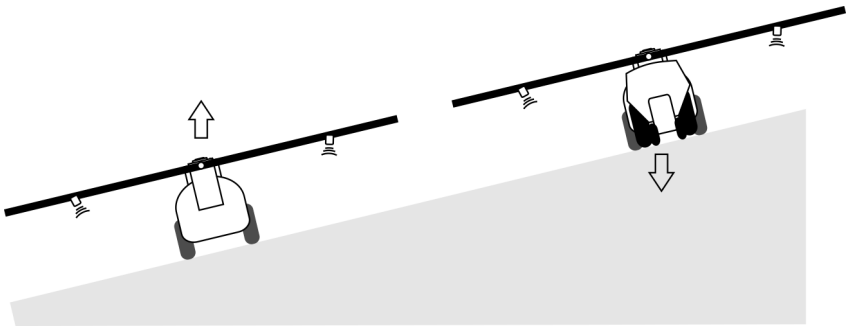
6.2.6 Reproducing the boom angle on hillsides

The "Reproduce boom angle" function supports the driver when working on hillsides.

Mode of operation

When working on a hillside, the boom slopes. The function saves the angle of slope.

After a turning manoeuvre, the angle of slope is reproduced when the field sprayer is travelling in the opposite direction.

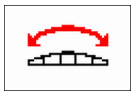
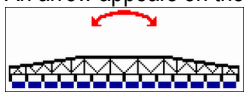
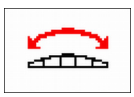


When turning on a hillside, the boom is automatically sloped in the opposite direction.

When the function is active, the current setting is shown above the boom on the work screen.

Prerequisites

☑ You have calibrated the "Reproduce boom angle" function. [→ 66]

1. Drive across the gradient with the field sprayer in place.
2. Use the multi-function joystick to set the boom angle required.
3.  – At the headland, press once to return the boom to the horizontal position. This enables you to turn without damaging the boom.
   ⇨ The job computer returns the boom to the horizontal position.
   ⇨ An arrow appears on the work screen while the function is being performed:
   
   ⇨ While the boom is moving, the following icon appears on the work screen . It shows which side of the boom is being raised.
4. Turn when the boom is horizontal.
5.  - After the turning manoeuvre, press once to lower the other side of the boom.

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⇨ The job computer slopes the boom in the opposite direction.

⇨ While the boom is moving, the following icon appears on the work screen .

⇨ The function switches off if you change the boom angle manually.

6.3 Controlling application

In this section you will learn how to use the job computer functions that are needed for spraying.

6.3.1 Setting rate

The rate is the amount of spray liquid you want to apply per hectare.

The job computer will attempt to stick to this set value during the work.

Methods

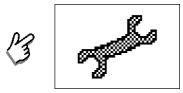
There are several ways to specify the rate:

- Enter rate in the "Parameters" screen.
- Take rate from the "TaskManager" application.

Procedure

Enter rate in the "Parameters" screen as follows:

1. Switch to the "Parameters" screen:



2. Enter rate in the "Rate" line.

⇨ The rate entered appears in brackets on the work screen.

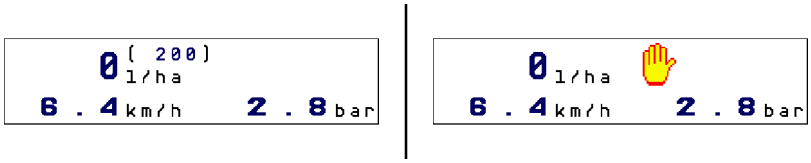
6.3.2 Changing application mode

The job computer lets you work in two modes:

- In automatic mode – the application rate will be adapted to the speed.
- In manual mode - the application rate will not be regulated automatically.

Illustration

On the following diagram you see how this function is shown on the work screen:



Left: Automatic mode, Right: Manual mode

Controls

Use the following function keys to operate the function:

Switch between manual and automatic mode

Using Automatic mode

In automatic mode, the job computer controls the spray pressure and the main section switch so the application rate can be reached.

You are in automatic mode when one of the following icons appears in the spray data area of the work screen:

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Icon on the work screen	Meaning
Application rate is shown in brackets	Field sprayer can carry out application. The spray pressure is regulated so that the application rate can be achieved.
	The speed of the field sprayer is below "Minimum speed". Field sprayer can carry out application. Spray pressure is not regulated.
	The speed of the field sprayer is below "Min. Auto speed". Field sprayer automatically switches off.

Mode of operation

The spray pressure is adjusted automatically in the following cases:

- Speed of the field sprayer has changed.
- Number of sections switched on has changed.
- You have changed the application rate manually.
- The application rate has been changed by the information from the application map.

The speed and precision with which the rate is adjusted depend on the value of the "Regul. factor" parameter.

You can change the rate manually while driving in automatic mode.

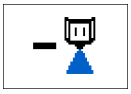
Prerequisites

To use automatic mode, the following conditions must be fulfilled:

- Rate has been entered.
- Flow meter is calibrated.
- Wheel sensor is calibrated.
- Working width is set.
- The speed of the field sprayer is higher than the "Min Auto speed" specified.
- The "Regul. factor" parameter has been set.

Controls

To operate this function the user needs the multi-function joystick first of all.

Function icon	Function
	Increase rate by 10%
	Reduce rate by 10%
	Set rate to 100%

Changing application rate in manual mode

When the field sprayer is in manual mode the application is not regulated according to a specified rate. The application rate must be set manually instead.

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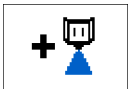
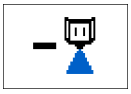
The application is in manual mode when the following icon appears in the spray data area of the work screen:

Application in manual mode

Controls

To operate this function the user needs the multi-function joystick first of all.

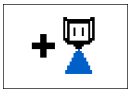
Use the following function keys to operate the function:

Function icon	Function
	Increase application rate.
	Reduce application rate.

Procedure

You can increase the application rate as follows:

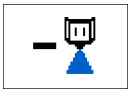
☑ Manual application mode is active.

1.  - press and keep pressed.
   ⇨ As long as the button is pressed, the regulation valve is continuously closed further. The application rate continuously increases.
   ⇨ The current value in the "Spray data" area of the work screen is increased.

Procedure

You can reduce the application rate as follows:

☑ Manual application mode is active.

1.  - press and keep pressed.
   ⇨ As long as the button is pressed, the regulation valve is continuously opened further. The application rate reduces.
   ⇨ The current value in the "Spray data" area of the work screen is reduced.

6.3.3 Starting application

Procedure

Start application as follows:

☑ The tractor with the field sprayer is on the field.

☑ You have configured the job computer.

☑ You have folded out the boom.

1. Make sure that all preconditions are fulfilled!
2.

- Start application.
   ⇨ In manual mode:
   The field sprayer begins to spray.

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Spray cones appear below the boom icon:

⇨ In automatic mode:
the field sprayer is ready for application.

As long as the field sprayer does not move, the icon appears in the work screen.

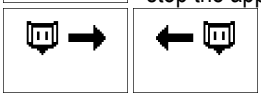
3. In automatic mode:
Start up and exceed minimum auto speed (Parameter "Min. Auto speed").
⇨ As soon as the minimum auto speed is exceeded, the field sprayer starts to spray.
Spray cones appear below the boom icon:

⇨ You have started the application.

6.3.4 Stopping application

You can stop application in the following ways:

-

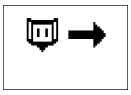
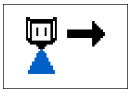
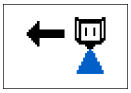
- stop the application.
-  - switch off all sections.
- Move slower than the set minimum speed (only in automatic mode).

6.3.5 Operating sections

Controls

To operate this function the user needs the multi-function joystick first of all.

Use the following function keys to operate the function:

Function icon	Function
	Switch off sections from left to right
	Switch off sections from right to left
	Switch on sections from left to right or When all sections are switched off, only then switch on the first section on the left.
	Switch on sections from right to left or When all sections are switched off, only then switch on the first section on the right.

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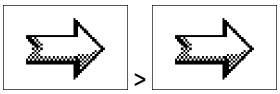
6.3.6 Using foam markers

Foam markers produce foam which the field sprayer driver can apply to the field at the ends of the boom. The driver can then drive parallel to the foam.

Path

To access the controls:



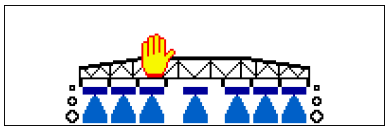
Controls

Use the following function keys to operate the function:

Function icon	Function	Effect
	Switch the left foam marker on and off.	The foam marker is switched on and off each time it is pressed.
	Switch the right foam marker on and off.	

Illustration

On the following diagram you see how this function is shown on the work screen:



Foam markers on both ends of the boom activated

6.3.7 Dealing with weed infestations

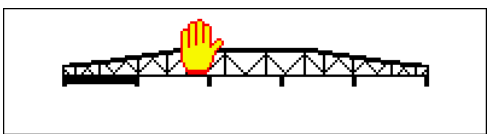
"Localized mode" is designed for the targeted treatment of small weed infestations.

In contrast to normal mode, in localized mode you can switch individual sections on and off, even when they are not adjacent to one another.

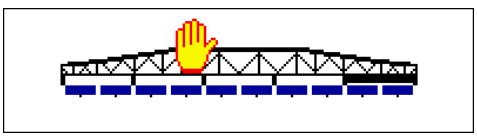
Work screen in localized mode

The work screen in localized mode differs slightly from the normal work screen.

In the boom terminal a cursor bar appears below the boom:



Cursor bar fully to the left



Cursor bar fully to the right

Preselecting and switching off sections in localized mode

Regardless of whether the sprayer is applying, you can move the cursor bar below any section and change the section's state.

Controls

Use the following function keys to operate the function:

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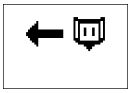
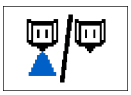
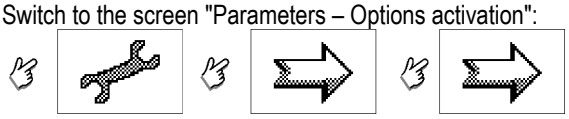
Function icon	Function
	Move cursor bar to the left
	Move cursor bar to the right
	Preselect or switch off marked section
	When some sections are preselected, start application on these sections
	When no sections are preselected, start application on all sections

Activating localized mode

Procedure

1. Switch to the screen "Parameters – Options activation":

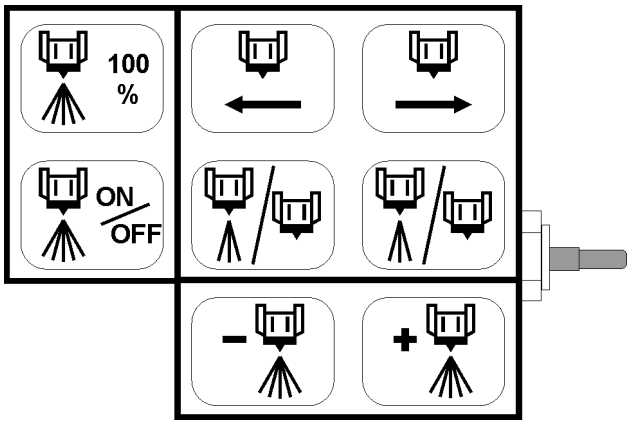


2. Click on the value under the line "Section switching".
   ⇨ A list appears.
3. Click on "Localized mode".
   ⇨ Under the line "Section switching" the value "Localized mode" appears.
4. - Restart terminal.

⇨ Localized mode is active after the restart.

Multi-function joystick in localized mode

In localized mode the assignment of buttons on the multi-function joystick changes:



Button assignment in localized mode

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6.3.8 Operating PWM regulation

There are field sprayers in which the application rate is regulated via the speed of the spray liquid pump instead of a regulation valve.

This type of control is described as "PWM control" for short.

Mode of operation

PWM control is only possible with field sprayers whose application rate is only controlled by the rotations of the spray liquid pump. In this, the spray liquid pump will be controlled via a hydraulic proportional valve.

The job computer can control the proportional valve and specify the desired speed to it.

The are two ways to use PWM regulation:
- Permanent PWM control
- Manual activation of the PWM control

Permanent PWM control

In this type of PWM control the PWM control is always active.

As soon as you start the job computer, the spray liquid pump will be automatically set to the speed at which it was last used.

You do not need to set anything else then.

Manual activation of the PWM control

In this type of PWM regulation you can manually activate and deactivate the spray pump.

Controls

Function icon	Meaning
	Activating and deactivating PWM regulation

Icons

Icon	Meaning
	PWM regulation is activated
	PWM regulation is deactivated

6.4 Documenting work results

You can document your work in the "Counters" screen.

In the "Counters" screen there are two types of counter:
- Day counter – documents the work until it is deleted.
- Total counter – documents the work since first start-up.

The "Counters" screen has the following information:
- **Volume** – applied volume.
- **Area** – area processed.

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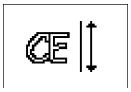
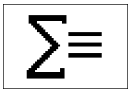
- **Distance** – distance driven during the application.
- **Work time** – Total duration of the application.

Controls

Use the following function keys to operate the function:

Function icon	Function
	Clear "Volume" counter
	Clear "Area" counter
	Clear "Distance" counter
	Clear "Work time" counter
	Back to work screen
	Delete the contents of the day counter shown
	Stop day counter - The record of the work will be retained until the terminal is restarted or the function button is pressed again. - The icon on the work screen flashes:
	Show the next day counter
	Activate the day counter shown
	Show the previous day counter

Mode of operation

All the work you carry out is recorded by the activated day counter.

You can only change the number of the activated day counter manually. If you do not change the number of the activated day counter, on the next day it continues from where it stopped.

Procedure

To activate a day counter:

1. Change to "Counters" screen:

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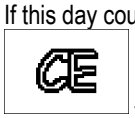
2. - Select the day counter you wish to activate.
3. If this day counter already contains results, you can:
    - Delete the contents of the day counter shown.
   - Activate the day counter shown.
   ⇨ A check-mark appears next to the counter number.
4. Start work.

On finishing work:

1. Make a note of the results recorded.
2. Activate a day counter before starting work again.

6.5 Operating the multi-function joystick

With the multi-function joystick you can activate and deactivate the field sprayer functions.

For example:
- Switching on main sections switch
- Switching off sections from left to right
- Raising and lowering boom manually

The button assignment is dependent on:
- Field sprayer model
- Configuration of the field sprayer

At the end of the operating instructions you will find a loose sticker with the multi-function joystick configuration on it.

Mode of operation

Three functions are assigned to each button on the multi-function joystick. Which function is executed when a button is pressed depends on the position of the side switch.

Position of the switch	Color of the LED
	Red
	Yellow
	Green

Procedure

The multi-function joystick is operated as follows:

☑ The work screen is called up.

1. Bring side switch into the desired position and fasten.
   ⇨ The LED on the multi-function joystick lights in the corresponding color.
2. Press button with the function desired.
   ⇨ Function will be activated.

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3. To terminate the function, release pressed button and the side switch.

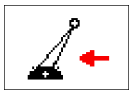
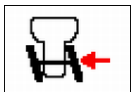
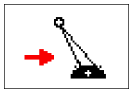
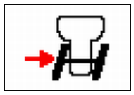
6.6 Steering a trailed implement manually

In some field sprayers, you can steer the trailed implement manually so that its tyres follow the tractor tracks precisely.

You can skip this section if the "TRAIL-Control" system is installed on your sprayer. See section: TRAIL-Control [→ 69]

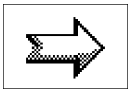
If the system is installed, one of the following symbols appears on the work screen:

- If the trailed implement is steered via the axle:
- If the trailed implement is steered via the drawbar:

Function	Function icon for drawbar steering	Function icon for axle steering
Steer trailer device to the left when the tractor moves to the right.		
Steer trailer device to the right when the tractor moves to the left.		

Procedure

To steer the trailer device:

1. Switch to the screen with the controls:
   
2. To steer the trailer device, press one of the function keys listed in the "Controls" table.
   ⇨ An arrow indicating the steering direction appears on the work screen.
   ⇨ The trailer device is steered.

6.7 Switching the lights on and off

Procedure

To switch the lights on and off:

1. Change to the additional screen:

2. - Press to switch the lights on or off.

6.8 Switching the rotating beacon on and off

Procedure

To switch the rotating beacon on and off:

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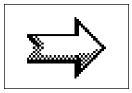
1. Change to the additional screen:
> 
2. - Press to switch the rotating beacon on or off.

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7 Preparing job computer sprayer for use

7.1 What should you configure, and when?

This section explains the configuration processes that you must carry out at different stages in the life of the field sprayer. From here, you are directed to sections where these functions are described.

During initial commissioning

You must configure the following settings before using the field sprayer for the first time:

You must configure	Section containing further information
Field sprayer parameters	Entering field sprayer parameters [→ 43]
Field sprayer geometry	Setting sprayer geometry [→ 50]
Type of tank filling	Setting filling type [→ 47]
Calibrate the flow meter	Calibrating the flow meter [→ 52]
Calibrate the wheel sensor	Calibrating the wheel sensor [→ 49]
Configure the sections	Configuring sections [→ 48]

7.2 Entering field sprayer parameters

When to enter?

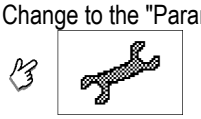
Enter the parameters in the following cases:

- Before the first start-up.
- If the field sprayer parameters change.

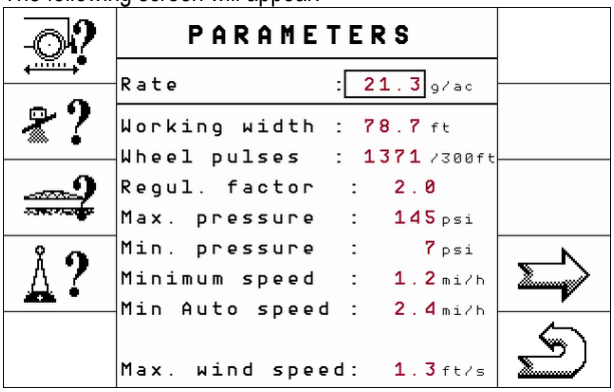
Procedure

To change the value of a parameter:

1. Change to the "Parameters" screen:



⇨ The following screen will appear:


PARAMETERS
Rate : 21.3 g/ac
Working width : 78.7 ft
Wheel pulses : 1371 /300ft
Regul. factor : 2.0
Max. pressure : 145 psi
Min. pressure : 7 psi
Minimum speed : 1.2 mi/h
Min Auto speed : 2.4 mi/h
Max. wind speed: 1.3 ft/s

2. - Turn the rotary knob to move the square cursor to the line with the parameter you wish to change. On terminals without a rotary knob, use the keys on the terminal.

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3. - Press the rotary knob.
   ⇨ The data input screen appears.
4. Enter the desired value.
5. Highlight "OK" and click on it to terminate the input and apply the value.
   ⇨ The new value appears in the "Parameters" screen.

List of parameters

The list contains all parameters that can appear on the screen. Which parameters appear on your screen depends on the type and configuration of your field sprayer.

Nozzle

Color of the activated nozzles.

The colors are specified by the ISO standard. They can also be calibrated. [➞ 57]

Rate

The volume entered as the rate will be applied when the field sprayer is working in automatic mode.

Working width

Field sprayer working width.

Wheel pulses

Number of pulses the wheel sensor sends to the job computer on a 100m route. Used to calculate speed.

The number is determined by the wheel sensor calibration.

Regul. factor

In automatic mode the spray pressure of the nozzles will be adapted to the current speed of the field sprayer. The adaption should ensure that the volume of spray liquid that is sprayed is exactly what you defined in the rate. In this the regul. factor plays a decisive role.

The regul. factor adjusts the control speed:

- The higher the regul. factor, the faster the spray pressure is adjusted.
- The lower the regul. factor, the more slowly the spray pressure is adjusted.

When setting the regul. factor, take note of the following:

- If, during movement at constant speed, the current application volume jumps around the target value, you need to reduce the regul. factor.
- If, when speed is changing, the application volume does not adjust to the rate quickly enough, you need to increase the regul. factor.

Setting limit values for the spray pressure

This includes the following parameters:

- Max. pressure
- Min. pressure

This setting defines a spray pressure range within which the spray pressure is optimal.

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If the spray pressure is above or below the maximum limit values, an alarm will be triggered.

You can decide what limit values you want for yourself.

If no pressure sensor is installed on your sprayer, you must deactivate this function as follows:
- Enter value 0 in the min. pressure line.
- Enter value 0 in the max. pressure line.

Minimum speed

Minimum work speed

If the field sprayer falls below the minimum work speed, the following happens:
- Application will be switched off automatically.
- The work screen displays the icon:

Min Auto speed

Minimum auto speed

If the field sprayer falls below the minimum automatic speed, the following happens:
- The spray pressure control will be switched off automatically.
- Manual mode will be activated.
- The work screen displays the icon:

When the value is set to 0, this function is deactivated.

This parameter must be higher or the same as the parameter "Minimum speed".

Max. wind speed

Maximum wind speed

Wind sensor must be installed.

If the maximum wind speed is exceeded, an alarm will be triggered.

Tank size

Size of the tank for the spray liquid.

Tank level alarm

Tank alarm rest volume

When the volume of spray mixture in the tank falls below this value, an alarm message appears on the screen.

Pulses main flow

Number of pulses the flow meter sends to the job computer per one liter of liquid. Used to calculate the application rate.

The number is determined by the flow meter calibration.

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Pulses for tank filling

Number of pulses the tank filling flow meter sends to the job computer for one liter of liquid.

Extrem. nozzles mode

With this parameter you can specify which extremity nozzles are mounted on the boom. More about this in: Extremity nozzles [➞ 61]

Pump rpm

When the pump speed is higher than the maximum permitted pump speed, an error message appears. This allows drivers to have better control of their work and prevent the pump being damaged when the speed is too high.

The parameter includes two values:

- "Current"
  Indicates what the maximum pump speed is currently set to.
- "Set value"
  Used to change the maximum pump speed.

Procedure

This is how you save the current pump speed as the maximum permitted speed:

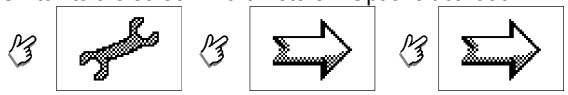
1. Highlight "Set value" line.
2. Bring pump speed to the desired value.
   ⇨ In the "Set value" line the current pump speed will be shown.
3. - Press.
   ⇨ The pump speed from the "Set value" line appears in the "Current" line. In this way it has become the maximum permitted pump speed.

7.3 Options activation

You can activate several options on the job computer.

Procedure

You can activate the desired option as follows:

1. Switch to the screen "Parameters – Options activation":
   
2. Click on the desired option.
   ⇨ A list with possible options will appear.
3. Select desired option from the list.
4. Restart the job computer.

⇨ The selected option will be activated after the restart.

7.3.1 Setting sections switching type

- Sections switching
  Type and way in which sections are switched on and off.

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– "Sequential mode" [➞ 35]

This type is intended for normal spraying work. It is also suitable for spraying on wedge-shaped areas and strips that are narrower than the working width of the field sprayer.

– "Localized mode" [➞ 36]

This mode is designed for treating weed infestations. Sections can be switched individually and independently of one another.

7.3.2 Setting filling type

- Filling mode
  – "manual"

    For field sprayers without TANK-Control.

  – "TANK-Control"

    For field sprayers with TANK-Control.

7.3.3 Setting joystick type

- Joystick type
  – "Without joystick"

    For the functions that are normally operated with the joystick, additional function icons appear on the terminal. The field sprayer can be operated with the terminal buttons. The function icons appear in the work screen extension.

    The multi-function joystick can continue to be used.

  – "ME-Joystick"

    An "ME-Joystick" is connected to the terminal. The field sprayer is operated with the joystick.

7.3.4 Setting manifold type

- Circulation type
  – "Non constant pressure"

    For manifolds without the "Constant pressure" function.

  – "Constant pressure"

    For manifolds with the "Constant pressure" function.

  – "D-Type"

    For field sprayers that use a pneumatic regulator to regulate the pressure.

7.3.5 Establishing CAN connection type

This parameter defines the way the job computer communicates with the terminal and which information is sent in the process. The configuration depends on the type of terminal.

- Serial N°:

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– On CAN Bus

The serial number of the hardware is transferred via CAN and appears in the selection menu on the terminal. Important for work with the "TaskManager" application.

– Not on CAN Bus

The serial number of the hardware is not transferred and does not appear in the selection menu on the terminal.

7.4 Configuring sections

7.4.1 Entering the number of nozzles per section

You must enter the number of nozzles installed on each section.

If you are using multi nozzles, a multi nozzle carrier counts as one nozzle.

When to enter?

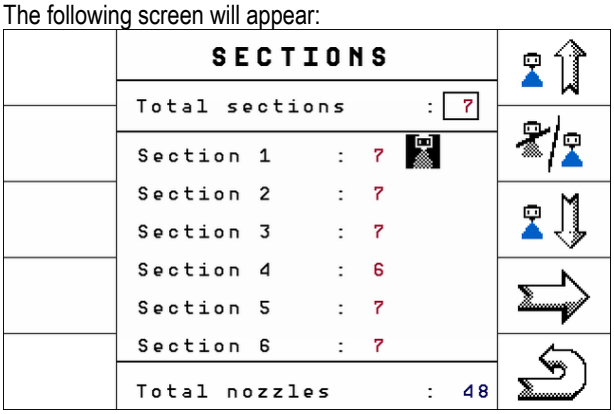
- Before the first start-up.
- When the number of nozzles in a section changes.

Procedure

Enter the number of nozzles per section as follows:

1. Switch to the "SECTIONS" screen:

⇨ The following screen will appear:



⇨ Next to each section appears the number of nozzles.

2. - Set the number of nozzles that must be changed.
   ⇨ The data input screen appears.
3. Enter desired number of nozzles.
4. - Exit screen.

7.4.2 Switching off section permanently

You can switch off any section permanently. This is useful, for example, if the tramlines in the field are designed for a smaller field sprayer than yours.

Effects

The effects of switching off the outer sections are as follows:

- With TRACK-Leader II: The newly calculated working width is not taken into account when using HEADLAND-Control.

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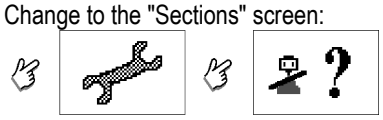
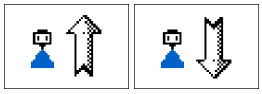
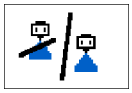
- With SECTION-Control: After switching off the outer sections, you will need to change the "Trace width" parameter so that the distance between the guidance lines matches the actual working width. You cannot change the "Working width" parameter.
- The actual working width changes. However, as the field sprayer has not changed:
  - Do **not** change the "Working width" parameter.
  - Do **not** change the field sprayer geometry.

Procedure

To switch a section off permanently:

1. Change to the "Sections" screen:

2.  - Select the section.
   ⇨ The cursor symbol appears alongside the selected section:
3.  - Switch the section off or on.

⇨ The following icon appears alongside the section that was switched off:

7.5 Calibrating the wheel sensor

When to calibrate?

- Before the first start-up.
- After changing tyres.
- When the speed shown on the work screen is incorrect.
- When the traveled route shown on the work screen is incorrect.

NOTICE

Imprecise calibration
The speed cannot be precisely determined with an incorrectly calibrated wheel sensor.
As a result all the calculations of the area sprayed, the route traveled and the volume applied will be highly imprecise.

- Calibrate the wheel sensor very precisely.

7.5.1 Determining pulses per 100 meters

When calibrating the wheel sensor with the 100m method, you determine the number of pulses received by the sensor in a distance of 100m.

In order for the system to function correctly, the wheel sensor must receive at least 250 pulses over a distance of 100 meters.

To increase the number of pulses, you must mount additional magnets opposite of the wheel sensor.

If you know the number of pulses for the wheel sensor you can enter this number manually as well.

Procedure

☑ Wheel sensor is mounted.

☑ All wheel sensor magnets are fully functional.

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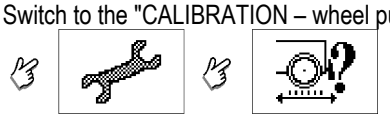
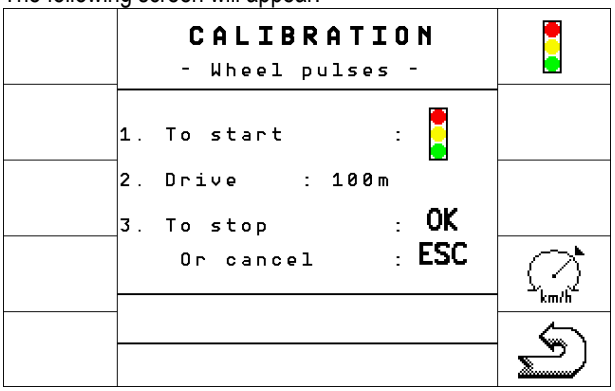
☑ A distance of 100m has been measured and marked. The distance must correspond to the field conditions. It should therefore lead over a meadow or a field.

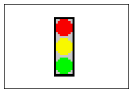
☑ The tractor with connected machine is operational for a 100m drive and is at the start of the marked distance.

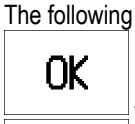
1. Make sure that all preconditions are fulfilled!
2. Switch to the "CALIBRATION – wheel pulse" screen:



⇨ The following screen will appear:

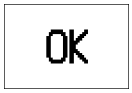


3.  - Start calibration.
4. The following function icons will appear:



- Stop calibration.

- Abort calibration.

5. Drive the previously measured 100m distance and stop at the end.
   ⇨ During the drive, the currently determined pulses are displayed.
6. 

- Stop calibration.
7. - Exit screen.

⇨ The number of pulses appears in the line "Wheel pulses"

7.6 Setting sprayer geometry

Sprayer geometry is set of parameters that describe the dimensions of your machine.

Setting the sprayer geometry lets the software know exactly how long and how wide the machine is and where the individual sections are located.

Sprayer geometry parameters

While setting the sprayer geometry you must measure the following parameters:

- CRP_X - On the diagram (4)

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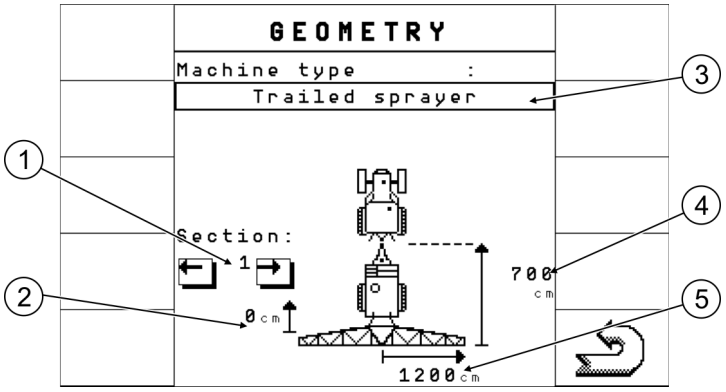
- DRP_Y - On the diagram (5)
- ERP_X - On the diagram (2)

The following table shows you where you measure these distances on different sprayers.

Type of sprayer	CRP_X (4)	DRP_Y (5)	ERP_X (2)
Trailed sprayer	Distance between the work point and the attachment point	Half the current working width	Only when there are sections on the sprayer that are closer or further away from the GPS antenna than the work point: - Work out the distance between the work point and the particular section
Mounted sprayer	Distance between the work point and the attachment point	Half the current working width.	
Self-propelled sprayer, with rear boom	Distance between the work point and the GPS antenna	Half the current working width	
Self-propelled sprayer, with boom in front	Distance between the work point and the GPS antenna	Half the current working width	

The trailed sprayer is shown on the diagram. If you have activated another sprayer, it appears on the terminal.

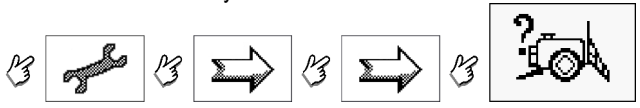


Sprayer geometry overview

(1)	Number of sections that are further away from or closer to the GPS antenna than the work point.	(3)	Type of sprayer
(2)	ERP X	(4)	CRP X
		(5)	DRP Y

Procedure

1. Switch to the "Geometry" screen:



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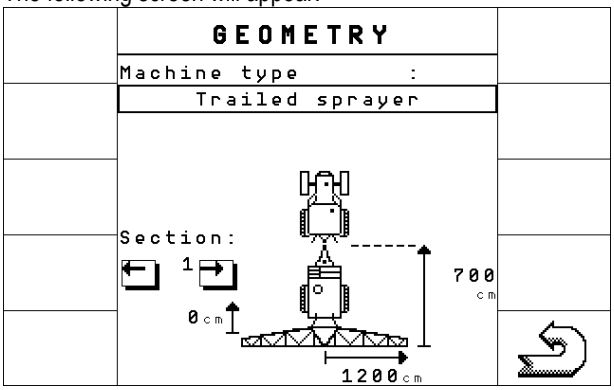
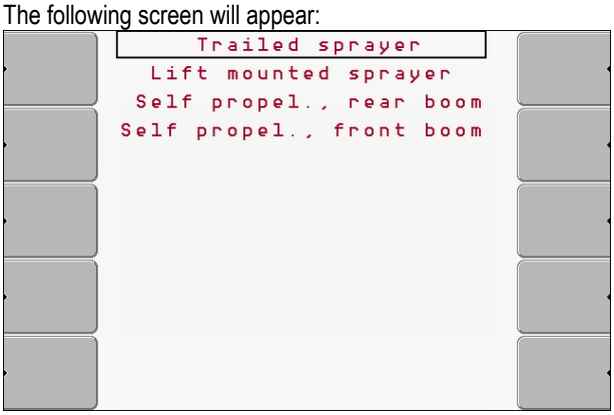
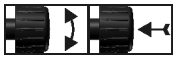
⇨ The following screen will appear:



2. Press the rotary knob:
   ⇨ The following screen will appear:



3. Click on your sprayer type.
   ⇨ A diagram of the sprayer appears.
4. Measure following distances on the sprayer:
   CRP_X, DRP_Y, ERP_X
5.  - Enter the values in the fields one after another.

7.7 Calibrating the flow meter

When to calibrate?

Because the number of pulses per liter can change during the lifespan of a flow meter, calibration must be carried out in the following cases:

- Before the first start-up.
- At the start of each season.
- When you detect deviations between the amount actually sprayed and the amount displayed.
- When you have replaced or repaired the flow meter.

Methods

There are two ways you can calibrate the flow meter:

- The tank method – it is time-consuming, but precise.
- The nozzle method – it is not as precise as the tank method, but is less time-consuming.

NOTICE

Imprecise calibration

If the calibration is imprecise, the calculations will be very inexact and the application imprecise.

◦ Calibrate the flow meter very precisely.

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7.7.1 Calibrating the flow meter with the tank method

Mode of operation

In the tank method a large quantity of water will be sprayed from the tank over a specific time.

The flow meter measures the pulses during this time.

After the application, you must enter the quantity of water that has been sprayed.

The computer works out the number of pulses per liter.

⚠ CAUTION

Spray liquid or spray liquid residues
Danger of poisoning or burning

- Clean the spray liquid container thoroughly prior to calibration. The field sprayer must be free of spray liquids or spray liquid residues.
- Use only clear water during calibration.
- Wear required protective equipment.

Procedure

☑ All sections are switched on.

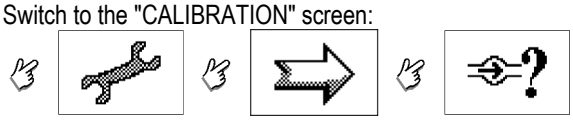
☑ Manual mode is activated (in the "Spray data" area of the work screen the icon appears).

☑ The tank is filled with clear water. For this you need several hundred liters of clear water.

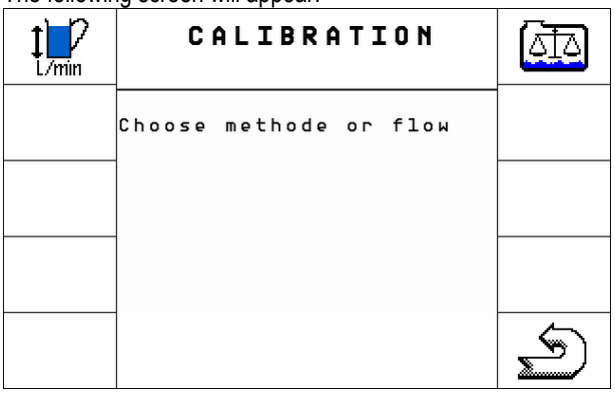
☑ You have the option of weighing the entire trailer or measuring the volume of water applied with another method.

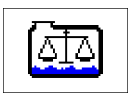
☑ Pump is switched on.

1. Make sure that all preconditions are fulfilled!
2. Switch to the "CALIBRATION" screen:



⇨ The following screen will appear:



3.  - Select tank method.

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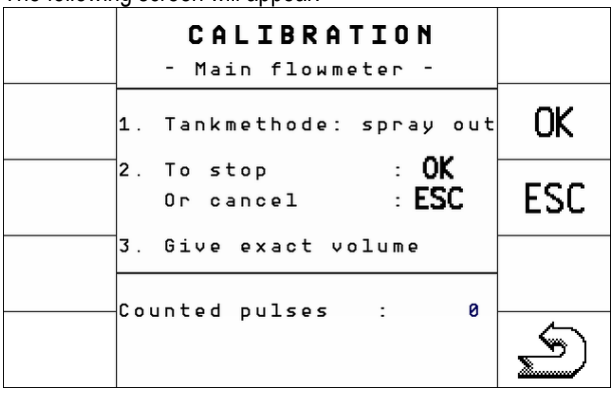
⇨ The following screen will appear:



4. - Start application.
   ⇨ During application the number of pulses will be counted in the screen "CALIBRATION – Main flowmeter".
5. Apply a few hundred liters. Do not empty the container fully. This prevents air bubbles forming and distorting the result.
6. - Stop applying.
   ⇨ The application will be stopped.
   ⇨ No pulses are counted on the terminal.
7. - Stop calibration.
   ⇨ A new line appears: "Water volume"
8. Determine the quantity applied. For example by weighing the tank before and after application and so working out the difference.
9. Enter the applied quantity in liters in the "Water volume" line.
10. - Exit screen.

⇨ You have calibrated the flow meter with the tank method.

7.7.2 Calibrating the flow meter with the nozzle method

During calibration of the flow meter with the nozzle method you determine the quantity of the liquid applied through a nozzle in a specific time.

Mode of operation

In the nozzle method water is applied through a nozzle over a specific time.

The flow meter measures the pulses during this time.

When you have stopped spraying, you must enter the quantity of water that was sprayed through the nozzle.

The computer works out the number of pulses per liter.

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⚠ CAUTION

Spray liquid or spray liquid residues
Danger of poisoning or burning

- Clean the spray liquid container thoroughly prior to calibration. The field sprayer must be free of spray liquids or spray liquid residues.
- Use only clear water during calibration.
- Wear required protective equipment.

NOTICE

To make calibration more accurate, you can carry out the calibration described below on several nozzles at the same time with the help of an assistant. You can then enter the average value on the terminal.

Procedure

☑ You have prepared a measuring beaker you can use to measure the quantity sprayed.

☑ You have prepared a stopwatch to be able to count one minute precisely.

☑ Only one section is preselected.

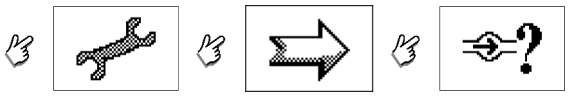
☑ Manual mode is activated (in the "Spray data" area of the work screen the icon appears).

☑ The tank is filled with clear water.

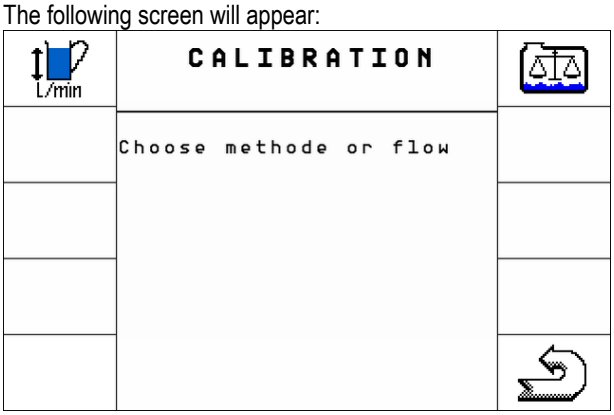
☑ The set working width is correct.

☑ The number of nozzles per section and the number of sections is entered correctly.

1. Make sure that all preconditions are fulfilled!
2. Switch to the "CALIBRATION" screen:



⇨ The following screen will appear:



3.

- Select nozzle method.

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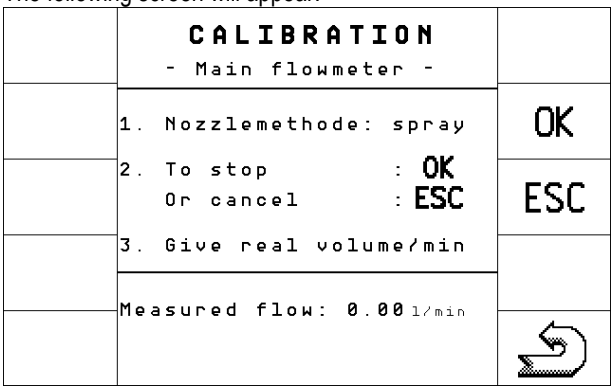
⇨ The following screen will appear:



⇨ The line "Measured flow" will display the previous flow rate.

4.

- Start application.

5. Go to one nozzle and for 60 seconds carefully collect the water sprayed by using the measuring beaker prepared.

6. Write down the water quantity sprayed.

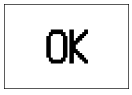
7. Repeat the last two steps on several nozzles.

8. Determine and note down an average of several measurements.

9.

- Stop applying.

⇨ The application will be stopped.

10. 

- Stop calibration.

⇨ Line "Real flow" appears.

11. Enter the average applied quantity in liters in the "Real flow" line.

12.
- Exit screen.

⇨ The value of the parameter "Pulses main flow" will be updated.

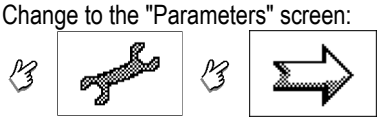
⇨ You have calibrated the flow meter with the nozzle method.

7.7.3 Manually entering the number of pulses per liter for the flow meter

If you know the precise number of pulses per liter for the flow meter, you can enter this value manually.

Procedure

1. Change to the "Parameters" screen:



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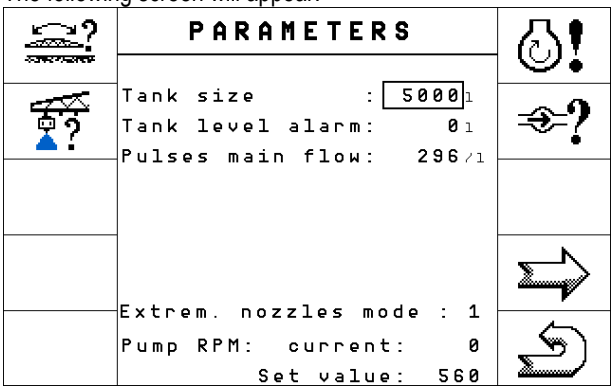
⇨ The following screen will appear:


PARAMETERS
Tank size : 5000 l
Tank level alarm: 0 l
Pulses main flow: 296 /l
Extrem. nozzles mode : 1
Pump RPM: current: 0
Set value: 560

2. Enter the number of pulses per liter in the line "Pulses main flow".

7.8 Configuring nozzles

By configuring the nozzle type, the job computer can calculate the current application rate based on the measured spray pressure.

Prerequisites

- Pressure sensor is fitted.

If no pressure sensor is fitted to the field sprayer and the application rate is regulated only via the flow rate, then you do not need to configure the nozzles.

7.8.1 Layout of the "NOZZLE/PRESSURE" screen

In the "NOZZLE/PRESSURE" screen you can configure the nozzles used.

Path

"NOZZLE/PRESSURE" screen consists of three areas:

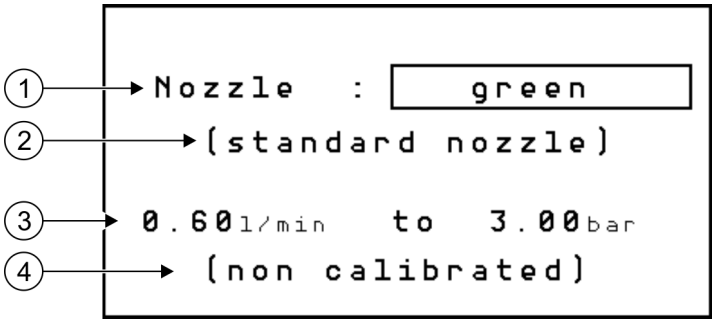
- Current nozzle settings
- Calculating possible application rates
- Nozzle calibration

The following sections provide an explanation of these three areas.

7.8.2 Selecting nozzle type

For the calculation of application rates to function correctly, you need to set which nozzles are fitted to your field sprayer and used.

You may only select one nozzle type. This nozzle type then applies to all nozzles for the field sprayer.



Area with current nozzle settings

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①	Selected nozzle	③	Current nozzle output at a specific pressure. If you change the pressure, the nozzle output will be adjusted automatically.
②	Type of nozzle: - standard nozzle - undefined nozzle	④	Calibration status

When to enter?

In the following cases you must select the nozzle type:

- If the field sprayer regulation works without a flow meter.
- If the field sprayer has no pressure sensor and the spray pressure should be shown.

The nozzle selection list contains 15 standard nozzle types as defined by ISO 10625 and 4 user-specific, freely configurable nozzles types A, B, C and D.

The following table shows an overview of the nozzles, their color and output:

Nozzle color in accordance with ISO 10625	ISO identifier	Output in l/min. at 3 bar
light violet	0050	0.2
light pink	0075	0.3
orange	01	0.4
Green	015	0.6
Yellow	02	0.8
violet	025	1.0
blue	03	1.2
purple	035	1.4
Red	04	1.6
brown	05	2.0
grey	06	2.4
white	08	3.2
light blue	10	4.0
light green	15	6.0
Nozzle A	-	Specific
Nozzle B	-	Specific
Nozzle C	-	Specific
Nozzle D	-	Specific

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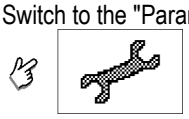
There are two ways of selecting the nozzle type:

Procedure 1

You select the nozzle type as follows:

1. Switch to the "Parameters" screen:



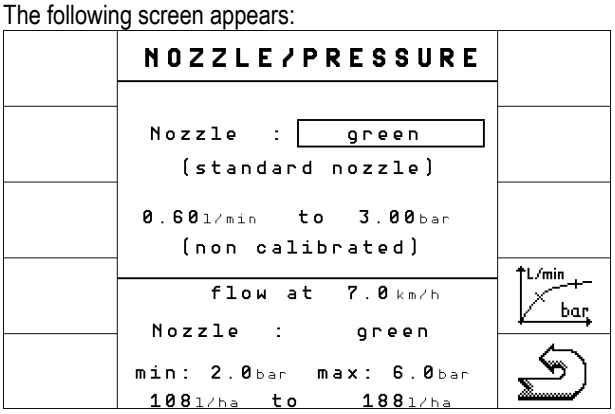
2. In the line "Nozzle" select the desired nozzle color.

Procedure 2

You select the nozzle type as follows:

1. Switch to the "NOZZLE/PRESSURE" screen:

⇨ The following screen appears:



2. Click on the field next to the "Nozzle" line.
   ⇨ A selection list will appear.
3. Select the desired nozzle color.

⇨ In the "NOZZLE/PRESSURE" screen the selected nozzle with the calculated application rate appears.

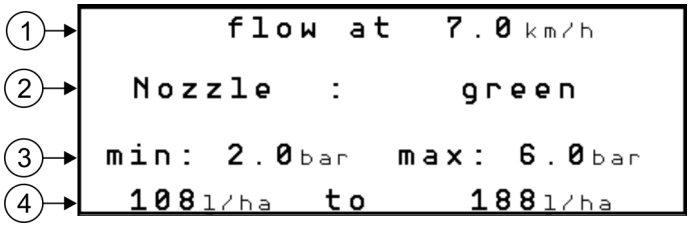
7.8.3 Calculating theoretical application rates

In the lower part of the "NOZZLE/PRESSURE" screen you can calculate theoretical application rates.

This allows you to see how the application rate can change as a function of the speed, nozzle type and pressure range. This is also based on the working width currently set for the field sprayer.

This calculation should help you find the nozzle that is appropriate for your task.

What you enter in this area has no influence on the actual regulation of the application rate.



Area for calculating application rates

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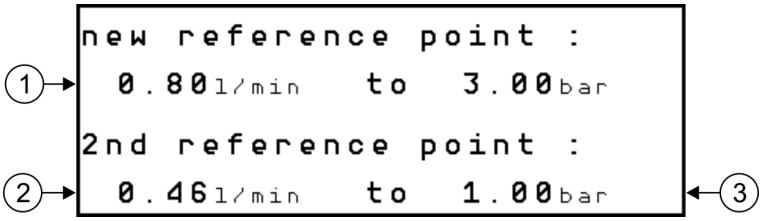
1	Theoretical application rates The calculated application rates will be calculated for this speed.	3	Minimum and maximum pressure. The pressure range defined by the pressure values should always be within the specification defined by the nozzle manufacturer.
2	Selected nozzle type	4	Calculated minimum and maximum application rates

7.8.4 Calibrating nozzles

Illustration



"NOZZLE/PRESSURE" when calibrating an undefined nozzle

1	Nozzle output at a pressure of 3 bar	3	Minimum nozzle pressure. Only appears for undefined nozzles.
2	Minimum output of the nozzle. Only appears for undefined nozzles.		

Procedure

CAUTION

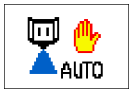
Poisonous spray liquid
Poisoning

- Always calibrate the nozzles using only clear water.
- Ensure that there are no spray liquid residues in the container or the lines.

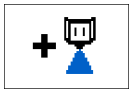
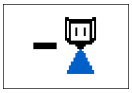
Calibrate a standard nozzle as follows:

☑ The tank is filled with clear water.

☑ There are no spray liquid residues in the tank or the pipelines.

1. 

- In the work screen switch the application mode to manual.
2.

- Start applying.
3.  and 
- Set spray pressure to 3 bar.
4. Using a measuring beaker collect the water from several nozzles for one minute long each.
5. Calculate average application rate.
6.

- Stop applying.

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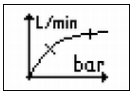
7.

- Activate automatic mode.
8. Switch to the "NOZZLE/PRESSURE" screen:

9. In the "Nozzle" line – select nozzle for calibration. Standard nozzles are referred to by their colors.
10. 

- Bring up second page.
11.
- In the box below the line "new reference point" enter the calculated average quantity in l/min.
12. For undefined nozzles you must also enter the nozzle's minimum output in the "2nd reference point" parameter.

⇨ You have calibrated the selected nozzle.

7.9 Extremity nozzles

Extremity nozzles are nozzles with a different spray pattern from the other nozzles on the boom. They can either restrict the spray width, in which case they are used for spraying field edges (corner nozzles), or increase the spray width of a section (wide area nozzles).

Before using extremity nozzles, note the following:

- Wide area nozzles or corner nozzles can be installed as extremity nozzles. You can choose the icon used to represent the extremity nozzle on the work screen.
- Extremity nozzles can be fitted at the outer end of any section.
- The width of the spray cone is irrelevant to the ISOBUS job computer. It is never detected and is not taken into account in the following calculations:
  - when calculating the working width,
  - when calculating the volume applied,
  - when calculating the tank content.
- The TRACK-Leader and SECTION-Control applications from Müller-Elektronik do not take account of the width of the spray cone from the extremity nozzles; they treat them as normal nozzles.. If you are using these applications, you may have to adjust the working width manually.

7.9.1 Configuring the extremity nozzles

The screen-shot below shows the screen used to configure the extremity nozzles:

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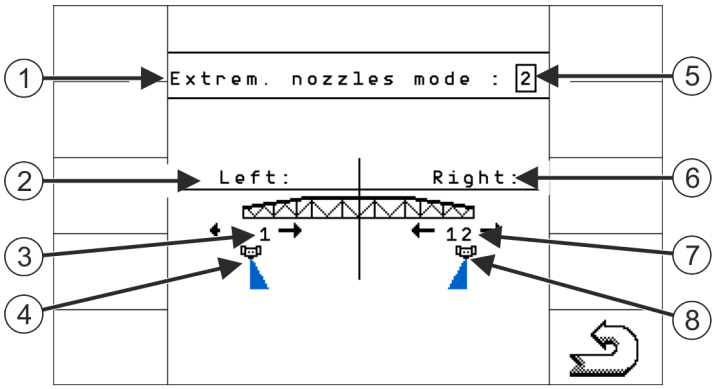

Screen for configuring the extremity nozzles

1	"Extrem. nozzles mode" parameter.	5	Cursor. Highlights the extremity nozzles mode currently selected.
2	Settings for the extremity nozzles on the left side of the boom.	6	Settings for the extremity nozzles on the right side of the boom.
3	Number of the section with the extremity nozzle installed on the outer left end.	7	Number of the section with the extremity nozzle installed on the outer right end.
4	Icon representing the extremity nozzle on the job computer.	8	Icon representing the extremity nozzle on the job computer.

"Extrem. nozzles mode" parameter.

You can define up to three sets of extremity nozzles via the "Extrem. nozzles mode" parameter. For each set, you can define the installation site and the relevant work screen icon.

Available extremity nozzle modes

Number	Meaning
1	This mode is configured with sample data at the factory. You can change the configuration.
2	You can configure this mode yourself.
3	You can configure this mode yourself.

Meaning of the icons

Icon	Meaning
	No nozzle
	Corner nozzle If a number appears next to the icon, this means that you can configure several nozzle pairs on your field sprayer.
	Wide area nozzle

Procedure

To configure the extrem. nozzles modes:

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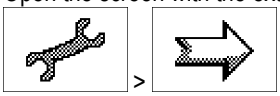
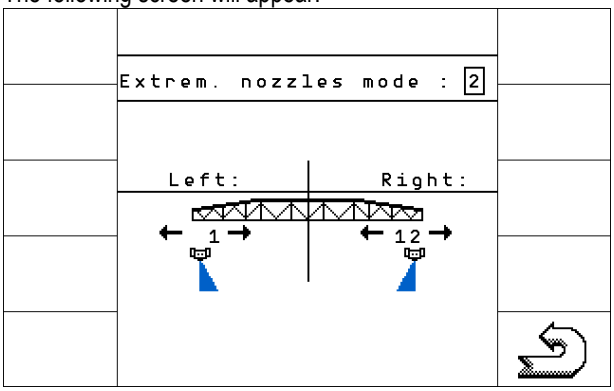
1. Open the screen with the extremity nozzle settings:



   ⇨ The following screen will appear:



2. In the "Extrem. nozzles mode" line, enter the set of extremity nozzles for which you wish to enter settings. For example "2":
   ⇨ The saved settings appear on the screen.
3. Using the cursor, highlight one of the nozzle icons below the boom icon and click on it.
   ⇨ A list of the available settings appears.
4. Select the type of extremity nozzle required.
   ⇨ An error message appears. This message informs you that the job computer must be restarted so that the changes can be applied. Do not restart the job computer yet; wait until you have entered all the settings.
   ⇨ The settings screen appears. The icon selected appears on the screen.
5. Repeat this step for the other side of the boom.
6. Using the cursor, highlight the number below the boom icon and click on it.
7. Enter the number of the section with the extremity nozzle installed on the outer end.
8. Restart the job computer.

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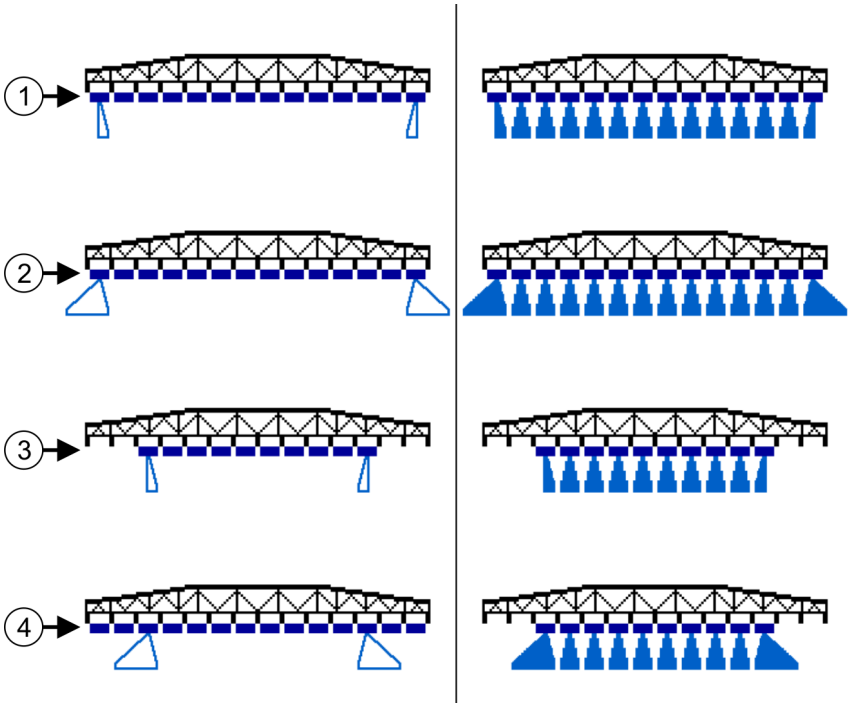
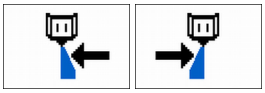
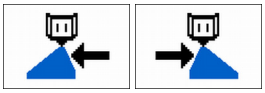
7.9.2 Operating the extremity nozzles



Extremity nozzles on the work screen: Left: before application; Right: during application.

1	Corner nozzles on sections 1 and 14
2	Wide area nozzles on sections 1 and 14
3	Corner nozzles on sections 3 and 12
4	Wide area nozzles on sections 3 and 12

Function icon	Meaning
	Activate and deactivate corner nozzles on left and right
	Activate and deactivate wide area nozzles on left and right

Procedure

To operate the extremity nozzles:

1. Stop application.
2. Change to the additional screens:

   ⇨ Function icons used to operate the extremity nozzles should appear on the screen.
3. Press the function keys for the extremity nozzles to show them on the screen.

   ⇨ Spray cones for the extremity nozzles appear below the boom icon. The icons are only used to show the extremity nozzle positions.

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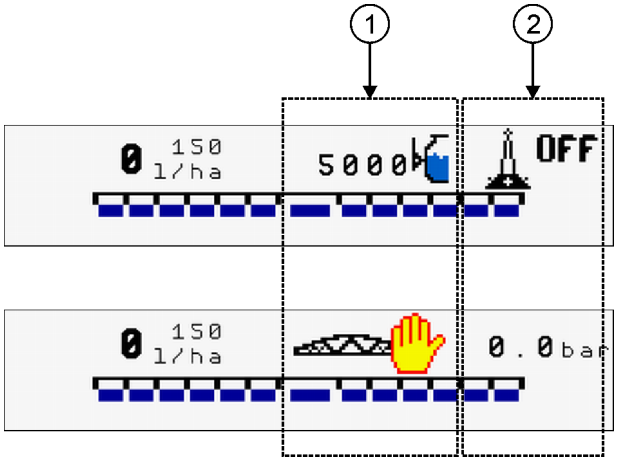
7.10 Selecting information for the header

If you connect the job computer to a Müller-Elektronik ISOBUS terminal, you have the option of displaying a summary of the status information in the header. This means, for example, that you can also keep an eye on the fill level and spray pressure while driving in parallel tracks with TRACK-Leader. You do not need an additional terminal for this.

You can only use this function in conjunction with Müller-Elektronik terminals.



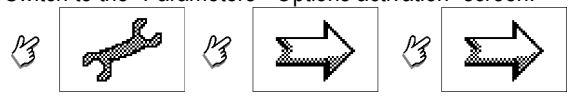
Areas of the "ME Header"

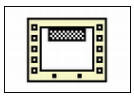
1	Left-hand column	2	Right-hand column

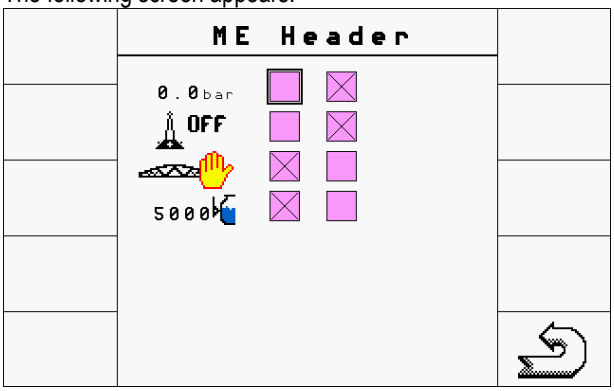
Procedure

To configure the "ME Header":

1. Switch to the "Parameters - Options activation" screen:



2.  - Open the "ME Header" screen.
   ⇨ The following screen appears:



   ⇨ This screen shows the job computer information that can be displayed in the header. Next to each icon there are two boxes that you can check. The left-hand box corresponds to the left-hand column of the header, and the right-hand box the right-hand column.
3. Using the rotary knob, place a check-mark against the information you wish to display in the header.
4. Exit the screen.

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⇨ The information selected flashes in the terminal header.

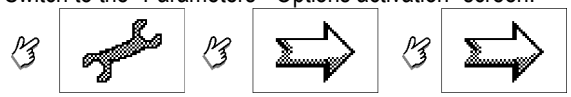
7.11 Displaying the job computer on a second terminal

If two ISOBUS terminals are connected to the ISOBUS basic equipment, the job computer may be displayed on the wrong terminal.

Procedure

To change the terminal:

1. Switch to the "Parameters - Options activation" screen:



2. - Press the function key.
   ⇨ The following message will appear: "To display the sprayer on a different terminal, switch off and restart!!! To cancel, acknowledge this message".
3. Restart the job computer.
   ⇨ After restarting, the job computer is displayed on the second terminal.

7.12 Calibrating sensors for the "Reproduce boom angle" function.

The purpose of the calibration process is to detect and save the boom position at maximum slope and in the horizontal position.

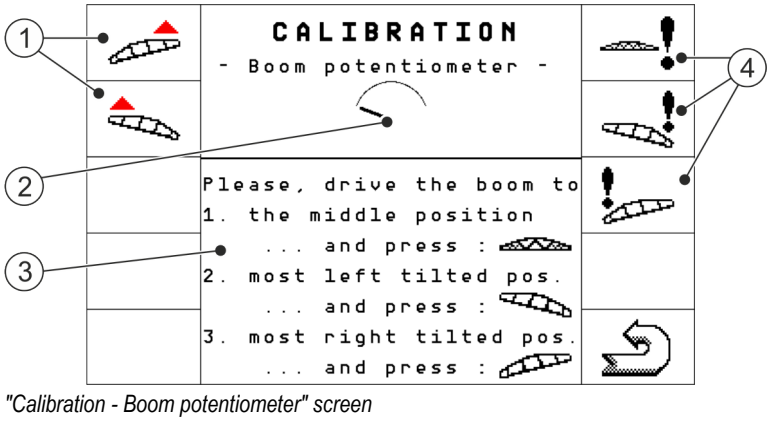
You must perform the calibration in the following instances:

- Prior to initial startup.
- If the display on the "Calibration - Boom potentiometer" screen does not match the boom position

Illustration

On the "Calibration - Boom potentiometer" screen you can:

1. Check whether the angle sensor (boom potentiometer) is correctly calibrated.
2. Calibrate the angle sensor (boom potentiometer).



"Calibration - Boom potentiometer" screen

(1)	Function keys to set the boom angle	(3)	Instructions
(2)	Current angle display The pointer must point upwards when the boom is horizontal on level ground.	(4)	Function keys to save individual statuses

Procedure

To calibrate the angle sensor:

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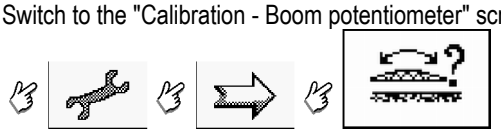
1. Position the field sprayer on level ground.
2. Switch to the "Calibration - Boom potentiometer" screen:



3. Follow the instructions on the screen.

7.13 Registering SECTION-Control for John Deere GS2600

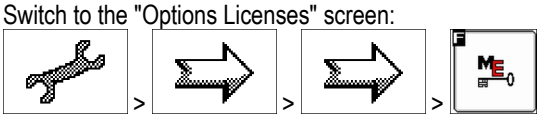
If you connect the job computer to a "John Deere Green Star 2600" terminal and wish to use "Swath Control" on the terminal, you will need to register with Müller-Elektronik.

You can obtain the current registration price from Müller-Elektronik sales representatives.

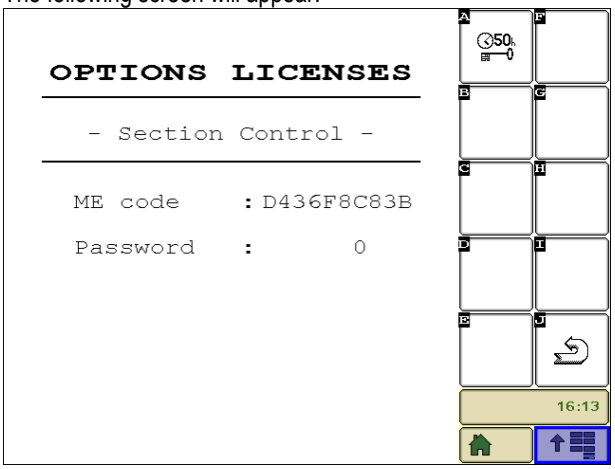
Procedure

To register the job computer for use with the Green Star terminal:

1. Switch to the "Options Licenses" screen:

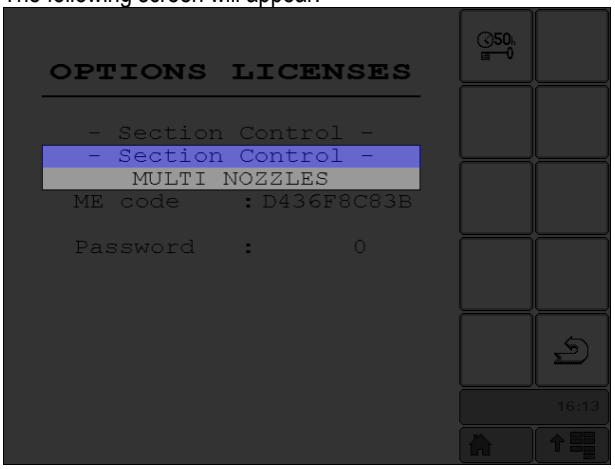


⇨ The following screen will appear:



2. You must now decide what you want to register.
3. To use the 50-hour test version, press the function key:
4. To activate the full version of Section-Control, touch the "Section Control" text.

⇨ The following screen will appear:



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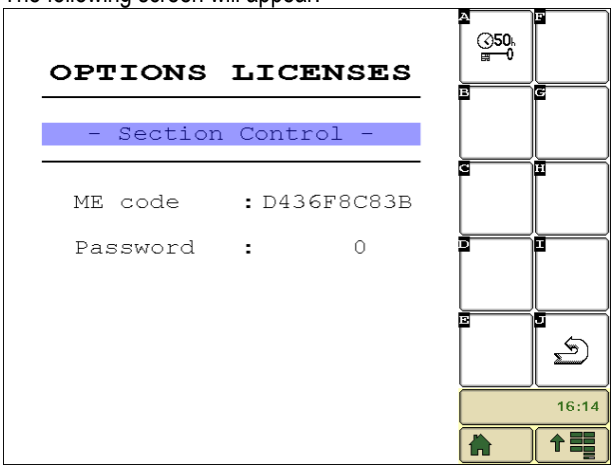
5. Select "Section Control".
   ⇨ The following screen will appear:



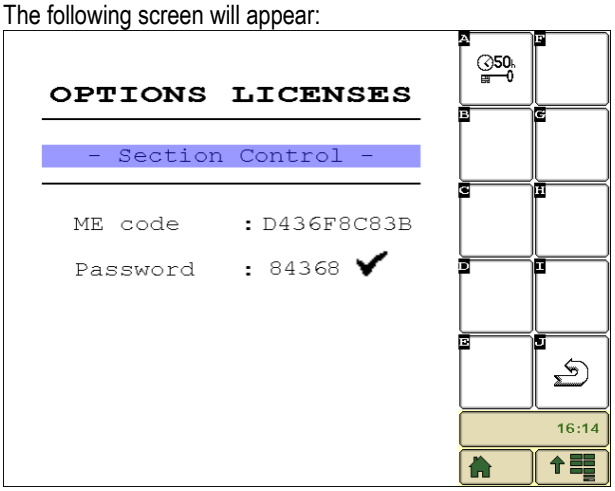
   ⇨ "Section Control" is now highlighted in blue.

6. Write down the "ME code" and give the number to a Müller-Elektronik employee.
   ⇨ This employee will give you a password.

7. When you have the password, re-open the "Options Licenses" screen.

8. Enter the password in the "Password" line.
   ⇨ The following message will appear:

9. Press "OK" to confirm.
   ⇨ The following screen will appear:



10. Restart the job computer.

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8 TRAIL-Control

8.1 TRAIL-Control – Using drawbar and axle steering

The TRAIL-Control system steers a trailer in such a way that its tires follow the tractor's track precisely.

Available functions

TRAIL-Control has the following functions:

- Steering of a trailer device:
  - Drawbar steering – the drawbar of the trailer device is steered in a selected direction.
  - Axle steering – the wheels of the trailer device are steered in a selected direction.
- Slope counter-steering:
  - Steering the trailer device against a slope, during work on inclined ground.

Prerequisites

The following minimal preconditions must be met for TRAIL-Control to work:

- Minimum speed = 3 km/h.. Steering is not possible at lower speeds.
- Maximum speed = 15 km/h. If you drive faster than 15 km/h, TRAIL-Control will be automatically switched off.
- Minimum oil throughput for the hydraulic system of the tractor = 25 l/min. The minimum oil throughput may be greater for large field sprayers.

Work mode

TRAIL-Control lets you work in two modes:

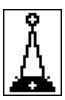
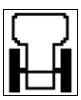
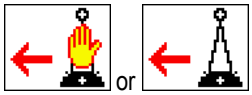
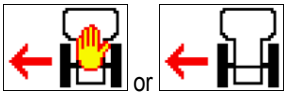
- in automatic mode
- in manual mode

Controls

Function	Function icon for drawbar steering	Function icon for axle steering
Switch TRAIL-Control on and off		
Switch between manual and automatic mode		

Illustration

The following icons appear on the work screen when TRAIL-Control is being operated:

Meaning	Icons for drawbar steering	Icons for axle steering
TRAIL-Control is in manual mode.		
TRAIL-Control is in automatic mode.		
The trailer device is being steered to the left.		

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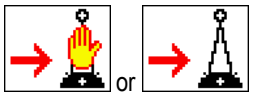
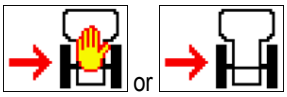
Meaning	Icons for drawbar steering	Icons for axle steering
The trailer device is being steered to the right.		

8.1.1 Steering the trailer device

WARNING

Risk of injury from movement of the trailer device
During steering, the trailer device moves to the side.
This may cause danger for persons and objects in the immediate vicinity of the trailer device.

- Ensure that nobody is in the range of the trailer device before steering it.

Steering in automatic mode

When you work in automatic mode the trailer device is steered automatically.

The gyroscope measures the directional change of the tractor and the job computer calculates the required angle for steering the trailer device.

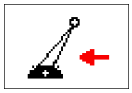
The icons on the work screen will tell you in which direction the trailer device is being steered.

Steering in manual mode

In manual mode you must steer the trailer device manually.

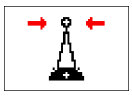
Procedure

Drive in a curve to the right as follows:

1. Driving the tractor to the right
2.  - Steer the trailer device for the drive to the right.
   - ⇨ With drawbar steering: The drawbar is steered to the left.
   - ⇨ With stub axle steering: The wheels are steered to the left.
   - ⇨ An arrow pointing left appears on the work screen.

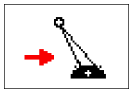
Procedure

This is how you drive straight again:

1. Drive the tractor straight ahead.
2.  - Steer the trailer device into the middle position.
   - ⇨ The trailer device moves slowly into the middle position.
   - ⇨ An arrow appears on the work screen. It shows in what direction the drawbar or axle is steering.

Procedure

Drive in a curve to the left as follows:

1. Driving the tractor to the left
2.  - Steer the trailer device for the drive to the left
   - ⇨ With drawbar steering: The drawbar is steered to the right.
   - ⇨ With stub axle steering: The wheels are steered to the right.

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⇨ An arrow pointing left appears on the work screen.

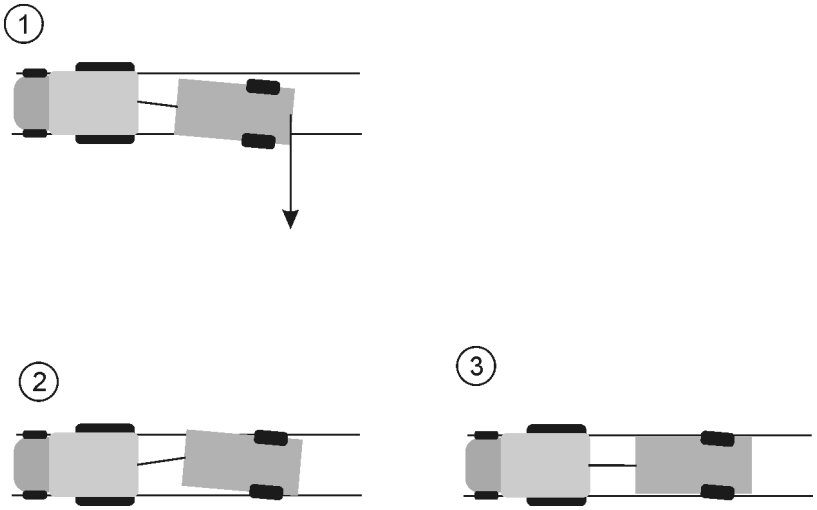
Steering the trailer device against the slope

For work on a slope you can use the 'slope counter-steering' function.

Mode of operation

When you activate the 'slope counter-steering' function you can offset the track of the trailer device to the left or right. The direction in which the track is offset depends if the slope climbs or falls to the left or right of the machine.

The aim of the 'slope counter-steering' function is to avoid the trailer device driving obliquely to the direction of work on a slope.



Steering the trailer device against the slope

1	Without TRAIL-Control	3	TRAIL-Control with axle steering
2	TRAIL-Control with drawbar steering		

Icons

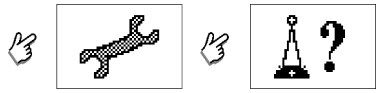
The following icons appear in the work screen. They show the direction in which the trailer device is being steered:

Meaning	Icon for drawbar steering	Icon for axle steering
The trailer device is being steered to the left.		
The trailer device is being steered to the right.		

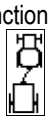
Procedure

You activate the "Slope counter-steering" function as follows:

1. Switch to the "TRAIL Control" screen:



2. - Activate or deactive "Slope counter-steering" function.

⇨ The following icon appears on the "TRAIL Control" screen: 

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Using slope counter-steering in automatic mode

When you work in automatic mode the trailer device is steered automatically.

Procedure

This is how you steer against the slope in automatic mode:

☑ The trailer device is equipped with a slope sensor.

☑ Slope counter-steering function is active.

1. During work on a slope the trailer device will automatically be steered against the slope.
   ⇨ Icons showing the direction of the steering appear on the work screen.
2. When the tires slip on the slope because of wet conditions, automatic mode is not as precise as it is under optimal conditions. In this case: Steer the trailer device manually against the slope.

Using slope counter-steering in manual mode

In manual mode you must steer the trailer device manually against the slope. Here you can decide yourself whether the trailer device should follow the track of the tractor or whether it should be offset.

8.1.2 Preparing TRAIL-Control for road driving

Before driving with the field sprayer on a public road you must switch TRAIL-Control off and if possible lock it with a locking bolt.

⚠ WARNING

Risk of accident through lateral movement of the trailer device
In road traffic TRAIL-Control can lead the trailer device to the side of the tractor track. This may cause a traffic accident.
Before you drive on a road:

- Steer the trailer device into the middle position!
- Switch off the TRAIL-Control!
- Lock the TRAIL-Control!

⚠ WARNING

Risk of accident with uncalibrated TRAIL-Control
If the middle position is not calibrated, the trailer device may move with an offset relative to the tractor's tracks. This may cause a traffic accident.
Before you drive on a road:

- Calibrate TRAIL-Control
- Ensure that when moving in a straight line the trailer device is pulled in a line behind the tractor.
- Switch off the TRAIL-Control!
- Lock the TRAIL-Control!

Locking TRAIL-Control

If the drawbar of the trailer device is fitted with a locking bolt, you must use it as an additional safety mechanism.

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Procedure

1. Activate manual mode.
   ⇨ The work screen displays the icon: or
2. Steer the trailer device in the middle position.
   ⇨ Drawbar or axle will be steered in the middle position.
3. Lock drawbar steering with the locking bolt.
   ⇨ In "Selectable area" [→ 17] of the work screen the following icon appears:
   ⇨ TRAIL-Control is ready for traveling on the road.

8.2 Configuring TRAIL-Control

8.2.1 TRAIL-Control parameters

In order to use TRAIL-Control with your trailer device, you need to set the following parameters:

Compensation time

Enter only for trailer devices with black-and-white hydraulics.

- The greater the value, the earlier cornering is commenced in automatic mode.
- The lesser the value, the later cornering is commenced in automatic mode.

Normally the value lies between: 700ms and 1000ms.

Hydraulik flow

Enter only for trailer devices with a proportional valve.

Hydraulic flow is a value used for setting the steering speed.

Normally the value lies between: 1.5%/° and 3%/°

Deviation tolerance

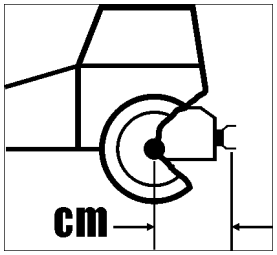
The deviation tolerance influences the behavior of steering in the middle position area.

The lower the tolerance is set, the more sensitively the control responds to small changes.

Normally the value lies between: 2° and 3°

Wheels<---->drawbar

Distance between the center of the rear axle of the tractor and the towing hook of the tractor.



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8.2.2 Calibrating TRAIL-Control

⚠ WARNING

Danger of injury from machine movements
When calibrating the proportional valve, the machine moves automatically in the bend area.
This may cause danger for you and for persons in direct proximity to the machine.

- Ensure that nobody is in the regulation range of the machine.
- Break off the calibration as soon as someone approaches the machine.

When to calibrate?

- Before the first start-up.
- At the start of each season.
- When inaccuracies occur.

Sequence

There are two steps involved in calibrating TRAIL-Control:

- Step 1: Teaching-in the middle position and end stops
  In this step you teach the job computer the position of the drawbar and/or the axle in the middle, left and right positions.
  The job computer calculates all interim positions itself.
- Step 2: Calibrating the hydraulics of the proportional valve
  Only for trailer devices with proportional valves
  In this step the trailer device is automatically steered to both sides and the tensions are measured.
  The calibration runs automatically.

Teaching-in the middle position and end stops

The appearance of the screens during calibration depends upon whether your trailer device is steered via drawbar or stud axle.

The procedure is however identical for both cases.

Procedure

Phase 1 Teach-in middle position

☑ TRAIL-Control is in manual mode.

☑ Subsurface is not sloped. Slope sensor must not recognize any slope. Otherwise the "Slope counter-steering" will not work properly.

1. Switch to the "TRAIL-Control" screen:

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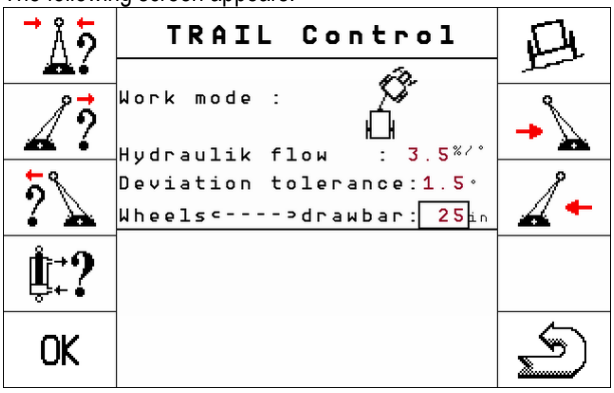
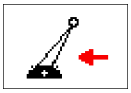
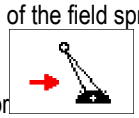
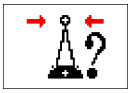
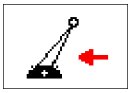
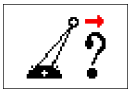
⇨ The following screen appears:



2. Set up the trailer device on flat ground in a line behind the tractor. Drive straight for a few meters until the tracks of the field sprayer run precisely into the tracks of the tractor.
 or  - set the middle position with the function keys.
3. Stop the tractor as soon as the field sprayer is exactly in line behind the tractor.
4.  - Call up middle position calibration.
   ⇨ The following message appears:
   "Middle position: the calibration is ready"
5. - Confirm within 3 seconds.
   ⇨ Calibration is initiated.
   ⇨ The following message appears:
   "Middle position: the calibration runs"
   ⇨ Phase 1 is completed when the message 'Middle position: the calibration runs" is no longer displayed.
   ⇨ You have calibrated the middle position.
6. You can start phase 2 of the calibration.

Phase 2 Teach-in end stops

1. **CAUTION! Do not calibrate the end stops in the maximum folded-out position, but shortly before it. Although this will restrict the turning circle, it ensures that the TRAIL-Control cylinders will not get damaged.**
2.  - Steer the trailer device almost fully to the left.
3.  - Start calibration.
   ⇨ The following message appears:
   "Most left position: the calibration is ready"
4. - Confirm within 3 seconds.
   ⇨ Calibration is initiated.

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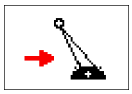
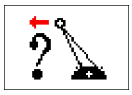
⇨ The following message appears:
"Most left position: the calibration runs"

5. Wait until the message "Most left position: the calibration runs" is no longer displayed.
6.  - Steer the trailer device almost fully to the right.
7.  - Start calibration.
   ⇨ The following message appears:
   "Most right position: the calibration is ready"
8. - Confirm within 3 seconds.
   ⇨ Calibration is initiated.
   ⇨ The following message appears:
   "Most right position: the calibration runs"
9. Wait until the message "Most right position: the calibration runs" is no longer displayed.

⇨ Phase 2 of calibration has been completed.

Calibrating the hydraulics of the proportional valve

You must only calibrate the hydraulics of the proportional valve when you use a trailer device with proportional valve.

WARNING

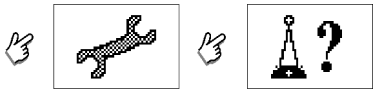
Risk of injury from movement of the trailer device
When calibrating the proportional valve, the trailer device moves automatically.
This may cause danger for you and for persons in the immediate vicinity of the trailer device.

- Ensure that nobody is in the regulation range of the trailer device.
- Break off the calibration with the function key as soon as someone approaches the trailer device.

Procedure

☑ TRAIL-Control is in manual mode.

☑ Subsurface is not sloped. Slope sensor must not recognize any slope. Otherwise the "Slope counter-steering" will not work properly.

1. Switch to the "TRAIL-Control" screen:
   

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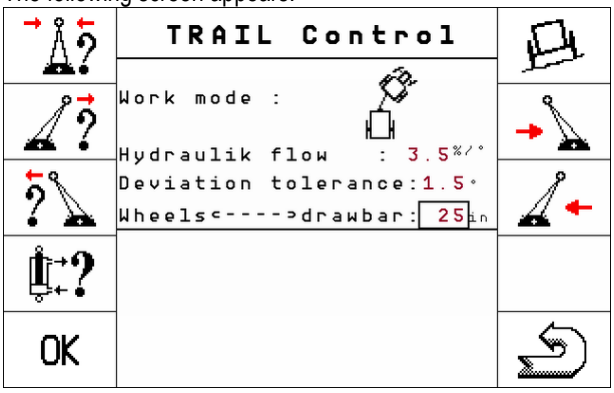
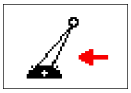
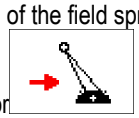
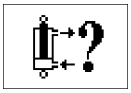
⇨ The following screen appears:



2. Set up the trailer device on flat ground in a line behind the tractor. Drive straight for a few meters until the tracks of the field sprayer run precisely into the tracks of the tractor.
 or  - set the middle position with the function keys.
3. Stop the tractor as soon as the field sprayer is exactly in line behind the tractor.
4.  - Start calibration.
   ⇨ The following message appears:
   "Hydraulics calibration ready“
5. - Confirm within 3 seconds.
   ⇨ The following message appears:
   "Hydraulics calibration runs“
   ⇨ The drawbar now moves slowly to the left and then slowly to the right.
   ⇨ This procedure may last up to 20 seconds.

⇨ Phase 3 is completed when the message "the calibration runs" is no longer displayed.

8.2.3 Configuring automatic steering of the trailer device to the middle position

From software version 6.4a TRAIL-Control can automatically center the trailer device.

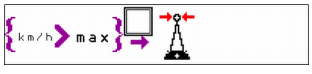
During centering the drawbar or axle is steered to the middle position.

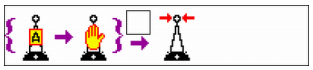
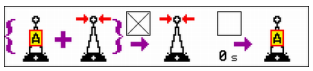
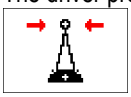
You can configure the conditions under which the trailed implement should be centered.

There are three centering mechanisms:

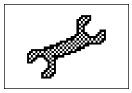
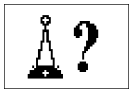
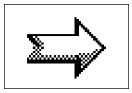
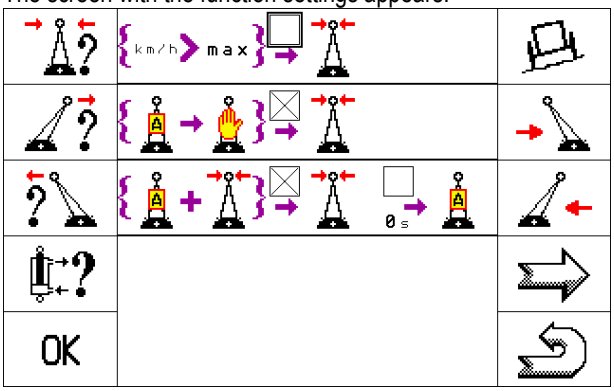
- If the sprayer exceeds the maximum speed.
- If you change the working mode from automatic to manual.
- If you try to steer to the middle position manually while you are working.

Available settings for centering

Picture	If this happens while working in automatic mode:	Effect
	The field sprayer in automatic mode exceeds the maximum speed.	▪ TRAIL-Control steers the trailer device to the middle position. ▪ TRAIL-Control switches to

Picture	If this happens while working in automatic mode:	Effect
		manual mode.
	The driver changes from automatic mode to manual mode in TRAIL-Control.	▪ TRAIL-Control steers the trailer device to the middle position. ▪ TRAIL-Control switches to manual mode.
	The driver presses function key  to center the drawbar manually.	▪ TRAIL-Control steers the trailer device to the middle position. ▪ TRAIL-Control switches to manual mode. ▪ Automatic mode is reactivated after a few seconds. You can specify how many seconds should elapse.

To configure centering of the trailer device:

1. Switch to the "TRAIL-Control" screen:
    > 
2.  - Open the next screen.
   ⇨ The screen with the function settings appears:
   

3. Check the box for each automatic system that you wish to activate.
4. Uncheck the box for automatic systems that you wish to deactivate.

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9 Maintenance and technical data

9.1 Preparing system for winter rest

The job computer is left on the field sprayer over the winter and must not be removed.

However the sprayer must be parked in an area that is dry.

9.2 Technical data

9.2.1 Technical data for the job computer

Technical data for job computers

Power supply	10 to16 Volt DC
Current consumption	400mA (without power output)
Standby current	70µA
Temperature range	-20°C to +70°C
Protection rating	IP66K to DIN40050 Dust-tight and protected against water jets
Environmental testing	Vibration and shock testing in accordance with IEC68-2
Dimensions	250 mm x 232 mm x 77 mm (LxBxH, without connector)

9.2.2 Field sprayer technical data

Note the machine data set for your field sprayer here.

Parameter	Value
Working width:	
Pulse wheel sensor	
Regul. factor	
Max. pressure	
Min. pressure	
Minimum work speed	
Minimum auto speed	
Maximum wind speed	

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Parameter	Value
Tank size	
Container alarm rest	
Pulses main flow	
Pulses tank filling	
Filling mode	
Joystick	
Circulation type	

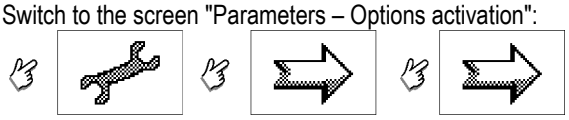
9.3 Checking the software version

In the Sprayer job computer application you can check the following versions of the software:

- OP: Version of the object pool used.

Procedure

1. Switch to the screen "Parameters – Options activation":



2. The currently installed software version appears on the lower edge of the screen.

9.4 Fault diagnostics

9.4.1 "Simulated speed" function

The simulated speed function is only used during tests and when looking for faults. It simulates movement of the machine when the machine is stationary.

You can also use this function for technical inspection (TÜV) of field sprayers.

Customer service employees can activate the "Simulated speed" function to check whether a sensor is functioning correctly.

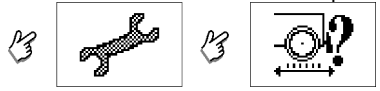
By default the value is set to 0 km/h and the function is switched off.

After a restart of the computer the function is always deactivated.

The most recently set value is saved and used during the next activation.

Procedure

1. Switch to the "Calibration / Wheel pulses" screen:



2. - Activate the simulated speed.
   ⇨ The "Simul. Speed" line appears.
3. - Open the data input screen.

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4. In the data input screen, enter the speed that should be simulated.
5. - Exit the screen.

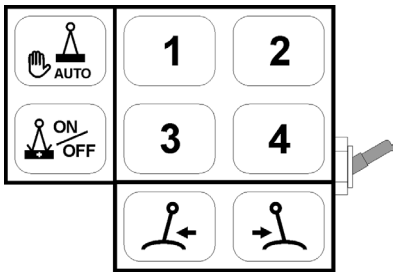
⇨ The set speed appears on the work screen.

9.5 Multi-function joystick button assignment

The illustrations below show which functions are activated when you press a specific button on the multi-function joystick.

The illustrations also show which position the side switch must be in:

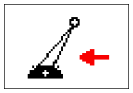
The button assignment presented below only applies to systems that have been configured in the standard configuration using the Müller-Configurator II. Field sprayer manufacturers may create their own button assignments which are different from those listed here.



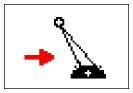
Switch between TRAIL-Control's manual and automatic mode

Switch TRAIL-Control on and off

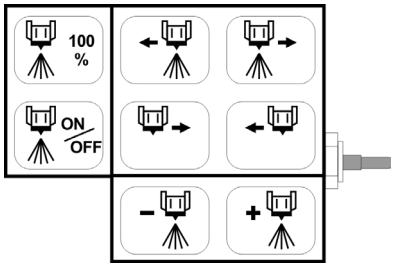
Buttons 1-4 are not assigned.



Steer trailer device to the left

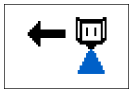


Steer trailer device to the right

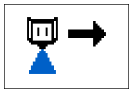


Set rate to 100%.

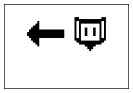
Switch section main switch on and off.



Switch on sections from right to left

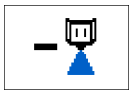


Switch on sections from left to right



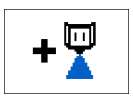
Switch off sections from right to left

Switching off sections from left to right



In automatic mode: Reduce rate by 10%

In manual mode: Reduce application rate.



In automatic mode: Increase rate by 10%

In manual mode: Increase application rate.

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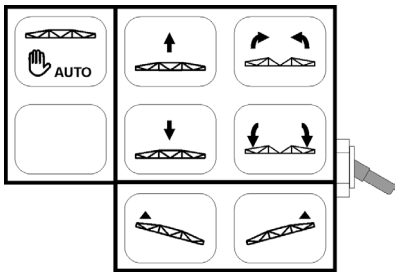
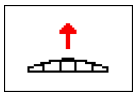
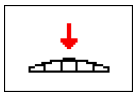


Switch between manual and automatic mode

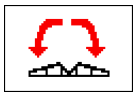


Lift boom

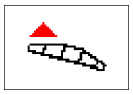


Lower boom

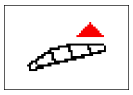
Tilt boom up symmetrically.



Tilt boom down symmetrically.



Raise boom on the left, lower boom on the right



Raise boom on the right, lower boom on the left

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10 Alarm messages

It may occur that a warning message or warning symbol appears on the terminal screen during work.

- Warning symbols appear in the header of the work screen.
- Warning messages appear in a pop-up window.

The following table lists possible error messages and a short help to remedy the fault.

Alarm messages connected with TRAIL-Control

Text of alarm message	Meaning
TRAIL Control Defective drawbar poti	The analog input voltage is outside of the valid range. Valid range: 0.5 V to 4.5 V **1.** Replace the angle sensor.
TRAIL Control Defective slope sensor	The analog input voltage is outside of the valid range. Valid range: 0.5 V to 4.5 V **1.** Replace the slope sensor.
TRAIL Control Defective gyroscope	The analog input voltage is outside of the valid range. Valid range: 0.5 V to 4.5 V **1.** Replace the gyroscope.
TRAIL Control Calibration must be done	No valid value for the drawbar middle position. **1.** Calibrate TRAIL-Control.
TRAIL Control Verify the parameters	Values in the configuration outside of the valid range: With drawbar steering: Drawbar length: 80cm - 300cm Frame length: 100cm - 500cm With axle steering: Drawbar length: 200cm - 800cm **1.** Enter the correct values in the password-protected area.
TRAIL Control The slope sensor is not correctly mounted	Valid voltage range during calibration: 1.5V to 3.5V
TRAIL Control The drawbar poti is not correctly mounted	Valid voltage range during calibration: 1.5V to 3.5V

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Text of alarm message	Meaning
TRAIL Control The gyroscope is not correctly mounted	Valid voltage range during calibration: 1.5V to 3.5V
TRAIL Control Drawbar poti is reversed	The wrong direction of rotation was detected during calibration of the end stops.
TRAIL Control Sensors are disturbed	Short signal interruptions with all sensors

Alarm messages connected with spray functions

Text of alarm message	Meaning
Low tank content	The volume of spray mixture in the tank has fallen below the "Tank level alarm" value.
SPRAY REGULATION Set value out of reach	The system cannot adjust the application rate to the rate.
SPRAYER Pump speed too low	The spray liquid pump's speed could be not achieved.
SPRAYER Pump speed too high	The spray liquid pump's maximum speed was exceeded.
SPRAY REGULATION The pressure is too low	The minimum spray pressure could not be achieved.
SPRAY REGULATION The pressure is too high	The maximum spray pressure was exceeded.
The wind is too strong	The wind is stronger than the maximum wind strength.

Alarm messages connected with the boom

Text of alarm message	Meaning
Boom out of transport position	Maximum speed of the field sprayer was exceeded.
Defective potentiometer	Alarm when height control is configured but the potentiometer is recognized as faulty.

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